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U.S. DEPARTMENT OF COMMERCE Philip M. Klutznick, Secretary of Commerce
NATIONAL TECHNICAL INFORMATION SERVICE Melvin S. Day, Director

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GOVERNMENT REPORTS

Announcements & Index

Volume 80, Number 17 August 15, 1980

CONTENTS

About NTIS & How To Order ii
How To Use iii
Subject Category and Subcategory Structure iv
NTIS Products v
Sample Entries vi
Reports Announcements 3237
Subject Index SU-1
Personal Author Index PA-1
Corporate Author Index CA-1
Contract Number Index CN-1
NTIS Order/Report Number Index AR-1
Price Codes ..... Outside Back Cover

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SAMPLE ENTRIES

MAIN ENTRY

Report entries are arranged by subject group and field. Within fields they are arranged alphanumerically by NTIS order number (accession number); alphabetic data precedes numeric.

Field 10 ENERGY CONVERSION (NON-PROPULSIVE)

Group 10A Conversion Techniques

Order number — **PB-254 315/5GA** — PC **A16/MF A01** — **Price codes**

Corporate author — Smithsonian Science Information Exchange, Inc., Washington, D.C.

Personal author — **Information on International Research and Development Activities in the Field of Energy,** David F. Hersey. May 76, 370p* NSF/RA-760057, Grant NSF-AER74-20678 — **Report title**

This directory is the product of a data collection effort undertaken by the Smithsonian Science Information Exchange (SSIE) on behalf of an interagency committee formed under the U.S. State Department to provide international cooperation in energy research and development. Included is information covering 1766 ongoing and recently completed energy research projects conducted in Canada, Italy, the Federal Republic of Germany, France, the Netherlands, the United Kingdom, and 25 other countries. In addition to the title and text of project summaries, the directory contains the following indexes: Subject Index, Investigator Index, Performing Organization Index, and Supporting Organization Index. — **Abstract of report**

INDEX ENTRIES

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ENERGY
Information on International Research and Development Activities in the Field of Energy.
PB-254 315/5GI 10A

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PERSONAL AUTHOR

HERSEY, DAVID F.
Information in International Research and Development Activities in the Field of Energy.
PB-254 315/5GI 10A

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CORPORATE AUTHOR

SMITHSONIAN SCIENCE INFORMATION EXCHANGE, INC., WASHINGTON, D.C.
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(NSF/RA-760057)
PB-254 315/5GI 10A

Entries are sequenced by corporate author name, original report number, and NTIS order number. The monitor agency number is given following the report title.

CONTRACT GRANT NUMBER

NSF-AER74-20678
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PB-254 315/5GI 10A

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PB-254 315/5GI
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PB-254 315/5GI 10A PC **A16**/MF **A01**

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REPORTS ANNOUNCEMENTS

1. AERONAUTICS

1A. Aerodynamics

AD-A083 703/9 PC **A11**/MF **A01**
Cranfield Inst of Tech (England)
Investigation of Three-Dimensional Shock Wave Boundary Layer Interactions. A Flow-Field Model of the Glancing Shock/Turbulent Boundary Layer Interaction.
Final scientific rept. Jun 76-Oct 79,
H. Kubota. Jan 80, 243p Rept no. COA-8001
Grant AFOSR-76-3006

Three-dimensional glancing-shock/turbulent boundary-layer interaction has been investigated at the Cranfield Institute of Technology in two separate test programmes using a 2.5 x 2.5 inch intermittent tunnel and a 9 x 9 inch continuous tunnel, at a Mach number of approximately 2.5. The experimental results include oil-flow pictures, vapour-screen photographs, surface static pressure distributions, local heat transfers, liquid crystal pictures of surface temperature, and viscous layer surveys. The test data indicate that the interaction region consists of two different viscous flows, the side-wall boundary layer and an induced layer originating near the shock generator root and crossing the path of the side-wall boundary layer. In this flow field model, no flow separation appears as long as the surface stream lines of the side-wall boundary layer can be pliable enough to be bent along the edge of the induced layer, even when the surface-flow deflection exceeds the shock angle. However, an ordinary separation does take place when the induced layer forces the surface stream lines to deflect beyond a maximum permissible angle. (Author)

AD-A083 717/9 PC **A04**/MF **A01**
Michigan State Univ East Lansing Div of Engineering Research
Summary of the AFOSR/MSU Research Specialists Workshop on Coherent Structure in Turbulent Boundary Layers. Held at Michigan State University July 30 to August 1, 1979.
Final rept. 1 Jul-30 Sep 79,
S. J. Kline, and R. E. Falco. 30 Sep 79, 68p
AFOSR-TR-80-0290
Contract F49620-79-C-0211
Prepared in cooperation with Stanford Univ., CA. Thermosciences Div. Rept. no. CSL-80-1.

There was general agreement that progress towards a consensus of turbulent boundary layer structural information was made, and that the directions which future research work should take were clarified. There was general recognition that a number of different coherent motions exist in the boundary layer, and that different techniques (both visual and probe) emphasize some at the expense of others. It is necessary to determine what role each of the coherent motions play, as well as the importance of the interactions between these motions. Substantial progress has been made, but a consensus emerged that more overlap of techniques and objectives is needed, and that more experiments which combine flow visualization with quantitative measurements should be performed. Three different theoretical approaches were discussed. Each qualitatively simulated the occurrence of some of the observed structural features, via their underlying mechanisms. At this stage, none of the theories can be considered complete or predictive. Some potentially important qualitative correspondences were made between numerical large eddy simulations and recent wall region data, although the computations still suffer from resolution, and perhaps spectral leakage problems.

AD-A083 740/1 PC **A05**/MF **A01**
Sheffield Univ (England) Dept of Chemical Engineering and Fuel Technology
Fundamental Modelling of Three-Dimensional Two-Phase Reacting Flow Systems.
Annual rept. 1 Mar-31 Dec 79,
J. C. Dutt. Jan 80, 88p AFOSR-TR-80-0301
Grant AFOSR-79-0072

A mathematical model capable of predicting three-dimensional, steady, incompressible, swirling/nonswirling, recirculating turbulent (cold and reacting) flows inside combustion chambers with different geometric configurations and load conditions is presented. The model included in this report is restricted to physical models which include a hydrodynamic turbulence model (the universal two-equation model of turbulence known as k-epsilon model), a single-phase combustion model (for both 'premixed' and 'unmixed' inlet fuel-air mixtures) and a six-flux radiation model.

AD-A083 741/9 PC **A06**/MF **A01**
Purdue Univ Lafayette IN Project Squid Headquarters
Colloquium on Flow Separation (January, 1979).
Summary rept.,
Roger L. Simpson. Aug 79, 108p Rept no. SQUID-SMU-3-PU
Contract N00014-75-C-1143
Prepared in cooperation with Southern Methodist Univ., Dallas TX.

Turbulent flow separation continues to be a nuisance to fluid dynamicists because it may be present in many practical machines or devices, thus reducing their performance, and because there is no adequate method to calculate such flows. In general, the maximum performance of such machines occurs at conditions close to the onset of separation. In order of increasing difficulty, designers need to know (a) whether or not a boundary layer separates for a prescribed pressure distribution, (b) how the pressure distribution is affected by boundary layer development with small regions of separated flow, and (c) how the overall performance is affected when large regions of separation are present. This Colloquium on Turbulent Flow Separation was held by Project SQUID at SMU to discuss fruitful areas for future research. A number of active researchers were invited to participate in discussions on five topics: terminology, measurements, flow modeling, unsteady effects, and control of separated flow. These topics are fundamental to future advances since a common nomenclature should be used to describe phenomena that are measured and modeled.

AD-A083 848/2 MF **A01**
Nielsen Engineering and Research Inc Mountain View CA
Data Report for an Extensive Store Separation Test Program Conducted at Supersonic Speeds.
Final rept. Jun 75-Aug 79,
Frederick K. Goodwin, and Calvin L. Dyer. Dec 79, 297p NEAR-TR-205, AFFDL-TR-79-3130
Contract F33615-76-C-3077
Availability: Microfiche copies only.

This report describes an extensive store separation test program conducted at Mach number range covering 1.5 to 2.5. The purpose of the program was to provide a systematic set of data which could be used to evaluate and improve analytical techniques for predicting supersonic store separation trajectories. Parent aircraft configurations tested ranged from a simple circular body, mid-wing configuration without pylons and racks to a noncircular fuselage with wing, flow through engine inlets, and pylons and racks. The parent configuration was built up component by component so model component effects could be isolated. Flow-field survey, store pressure-distribution, store force-and-moment and store trajectory data were obtained. The store tested were circular and elliptical in cross section with various fin arrangements. The data obtained during five wind-tunnel entries are summarized in this report. The data have been collected on magnetic tapes and FORTRAN computer programs have been written which retrieve the data from the tapes. This report also describes the use of these programs and tapes and describes the tabulated output from the programs. (Author)

N80-22255/7 PC**$5.00**
National Aeronautics and Space Administration, Washington, DC.
Aeronautical Engineering: A Continuing Bibliography, Supplement 120.
Mar 80, 93p NASA-SP-7037(120)

This bibliography contains abstracts for 297 reports, articles, and other documents introduced into the NASA scientific and technical information system in February 1980.

N80-22256/5 PC**$10.00**
National Aeronautics and Space Administration, Washington, DC.
A Cumulative Index to Aeronautical Engineering: A Continuing Bibliography, Supplement 118.
Jan 80, 779p NASA-SP-7037(118)
Revised.

Subject, personal author, corporate author, contract, and report number cumulative indexes are provided for documents cited in Aeronautical Engineering: A Continuing Bibliography from February 1979 through January 1980. (NASA SP 7037 supplements 106 through 117).

N80-22260/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Transonic Wing Dfvlr-F4 as European Test Model.
G. Redeker, and N. Schmidt. Jan 80, 12p NASA-TM-75752
Contract NASW-3199
Transl. Into English from Nachrichten-Tech. Z. (Germany, F.R.), Jun. 1979 p 36-39. Original Language Document Announced as A79-41234. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Dfvlr, Brunswick.

A transonic wing, the DFVLR-F4 was designed and tested as a model in European transonic wind tunnels and was found to give performance improvements over conventional wings. One reason for the improvement was the reduction of compression shocks in the transonic region as the result of improved wing design.

N80-22261/5 PC **A05**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Viscous-Inviscid Calculations of Jet Entrainment Effects on the Subsonic Flow over Nozzle Afterbodies.
R. G. Wilmoth. Apr 80, 79p NASA-TP-1626, L-13362

A viscous-inviscid interaction model was developed to account for jet entrainment effects in the prediction of the subsonic flow over nozzle afterbodies. The model is based on the concept of a weakly interacting shear layer in which the local streamline deflections due to entrainment are accounted for by a displacement-thickness type of correction to the inviscid plume boundary. The entire flow field is solved in an iterative manner to account for the effects on the inviscid external flow of the turbulent boundary layer, turbulent mixing and chemical reactions in the shear layer, and the inviscid jet exhaust flow. The components of the computational model are described, and numerical results are presented to illustrate the interactive effects of entrainment on the overall flow structure. The validity of the model is assessed by comparisons with data obtained form flow-field measurements on cold-air jet exhausts. Numerical results and experimental data are also given to show the entrainment effects on nozzle boattail drag under various jet exhaust and free-stream flow conditions.

N80-22262/3 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Investigation of the Flow Field Surrounding Circular-Arc Boattail Nozzles at Subsonic Speeds.
W. K. Abeyounis, and L. E. Putnam. May 80, 51p NASA-TP-1633, L-13318

The effects of jet exhaust on the subsonic flow field surrounding boattail nozzles with attached and separated boundary layers were investigated. Measurements of local Mach numbers and flow angles were made at free-stream Mach numbers of 0.60 and 0.80 at an angle of attack of 0 deg. Jet exhaust flow was simulated with a solid cylindrical sting and with high pressure air at jet-nozzle total pressure ratios of 2.9 and 5.0. Results show strong effects of the jet-wave structure on the external flow field. The predicted local Mach numbers and flow angles for attached-flow nozzles with solid jet simulators obtained by using subsonic inviscid/viscous-flow theory are in good agreement with experimental data. Prediction of nozzle surface pres-

sure distributions which include jet-entrainment effects also agree with experimental data for attached-flow nozzles with high pressure air jets.

N80-22263/1 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
A Finite Element Method for the Computation of Transonic Flow past Airfoils.
A. Eberle. Feb 80, 61p NASA-TM-75749, MBB-UFE-1352-0
Transl. Into English of "Eine Methode Finiter Elemente Zur Berechnung der Transonischen Potential-Stroemung Um Profile", Rept. Mbb-Ufe-1352-0 Messerschmidt-Boelkow G.M.B.H., Munich (Germany, F.R.), 23 Sep. 1977 63 p. Translation Was Announced as N79-23935. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

A finite element method for the computation of the transonic flow with shocks past airfoils is presented using the artificial viscosity concept for the local supersonic regime. Generally, the classic element types do not meet the accuracy requirements of advanced numerical aerodynamics requiring special attention to the choice of an appropriate element. A series of computed pressure distributions exhibits the usefulness of the method.

N80-22264/9 PC **A09**/MF **A01**
North Carolina State Univ. at Raleigh. Center for Acoustical Studies.
Experimental Study of Airfoil Trailing Edge Noise: Instrumentation, Methodology and Initial Results.
M.S. Thesis.
M. B. Manley. 1980, 199p NASA-CR-163007
Grant NSG-1377

The mechanisms of aerodynamic noise generation at the trailing edge of an airfoil is investigated. Instrumentation was designed, a miniature semiconductor strain-gauge pressure transducer and associated electronic amplifier circuitry were designed and tested and digital signal analysis techniques applied to gain insight into the relationship between the dynamic pressure close to the trailing edge and the sound in the acoustic far-field. Attempts are made to verify some trailing-edge noise generation characteristics as theoretically predicted by several contemporary acousticians. It is found that the noise detected in the far-field is comprised of the sum of many uncorrelated emissions radiating from the vicinity of the trailing edge. These emissions appear to be the result of acoustic energy radiation which has been converted by the trailing-edge noise mechanism from the dynamic fluid energy of independent streamwise 'strips' of the turbulent boundary layer flow.

N80-22266/4 PC **A10**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Full-Scale Wind Tunnel-Investigation of the Advanced Technology Light Twin-Engine Airplane (Atlit).
J. L. Hassell, Jr., W. A. Newsom, Jr., and L. P. Yip. May 80, 212p NASA-TP-1591, L-13135

An investigation was conducted to evaluate the aerodynamic performance, stability, and control characteristics of the Advanced Technology Light Twin Engine airplane (ATLIT). Data were measured over an angle of attack range from -4 deg to 20 deg for various angles of sideslip between -5 deg and 15 deg at Reynolds numbers of 0.0000023 and 0.0000035 for various settings of power and flap deflection. Measurements were also made by means of special thrust torque balances to determine the installed propeller characteristics. Part of the investigation was devoted to drag cleanup of the basic airplane and to the evaluation of the effect of winglets on drag and stability.

N80-22272/2 PC **A06**/MF **A01**
European Space Agency, Paris (France).
Calculation of the Interference Effects Between the Engine Wing and the Base Wing of a Civil and Military Transport Aircraft by the Vortex Lattice Method.
W. Schroeder. Dec 78, 101p ESA-TT-493, DLR-IB-151-77/19
Transl. Into English of "Berechnung der Interferenzwirkung Zwischen Triebwerks- und Basisfluegel AM Zivil-Militaerischen Transporter Nach Dem Wirbelleiterverfahren", Rept. Dlr-Ib-151-77/19 Dfvlr and Vfw-Fokker G.M.B.H., Bremen (Germany, F.R.), Dec. 1977. Original Report in German Previously Announced as X79-71705.

For incompressible symmetric flow, calculations of the interference between engine and basis wing of the VFW-Fokker 614 civil-military transport aircraft model were performed. The following parameters were used: angle of attack 0, 3, and 5 deg for three different engine wings each with -10%, 10%, 30% or 50% overlap between engine and basic wing. The results of the linear and nonlinear calculations are discussed.

N80-22273/0 PC **A04**/MF **A01**
European Space Agency, Paris (France).
Calculation of the Turbulent Boundary Layer on an Infinite Swept Wing Using a Three-Dimensional Mixing Length Model.
G. R. Schneider. Jul 79, 70p ESA-TT-534, DLR-FB-77-73
Transl. Into English of "Die Berechnung der Turbulenten Grenzschicht AM Schiebenden Fluegel Unendlicher Spannweite Mittels Eines Dreidimensionalen Mischungswegmodells", Rept. Dlr-FB-77-73 Dfvlr, Goettingen, (Germany, F.R.), May 1978. Original Report in German Previously Announced as X79-72041.

Experimental observations of three-dimensional turbulent boundary layers show that the direction of the shear stress is in general not parallel to the direction of the mean velocity gradient. Following this observation for the Reynolds shear stresses, a generalized mixing length model is developed based on a non-isotropically distributed eddy viscosity. The isotropic mixing length model currently used for three-dimensional flows is included as a special case. Calculations are carried out for the infinite swept wing situation of the VAN DEN BERG, ELSENAR and BOELSMA experiment. The comparisons show an improvement of the prediction over the isotropic calculations.

N80-22274/8 PC **A10**/MF **A01**
Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
Activities in Aerospace Research.
Annual Report, 1978.
1979, 208p
Original Contains Color Illustrations.

Aerodynamics, wind tunnel testing, structures, propulsion, physics, and materials science are among the topics discussed. Applications of aerospace research in industry are covered. Patents and publications issued during the year are listed.

N80-22275/5 PC **A05**/MF **A01**
Dornier-Werke G.m.b.H., Friedrichshafen (Germany, F.R.).
Supercritical Wing Design Studies for Transport Aircraft. Volume 1: Wing Design and Wind Tunnel Measurements.
Final Report.
G. Binder, H. Buers, and H. J. Proksch. Jul 79, 94p BMFT-FB-W-79-06-V-1
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

The design work and wind tunnel measurements for a supercritical wing for a transport aircraft to supplement the airbus A 300 are described.

N80-22276/3 PC **A07**/MF **A01**
Dornier-Werke G.m.b.H., Friedrichshafen (Germany, F.R.). Theoretical Aerodynamics.
Supercritical Wing Design Studies for Transport Aircraft. Volume 2: Theoretical Studies.
Final Report.
W. Fritz, S. Leicher, W. Schmidt, and H. W. Stock. Jul 79, 148p BMFT-FB-W-79-07-V-2
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

The improvement of currently existing computer methods for the design of supersonic transport aircraft was studied. This was achieved by modifying both equation and boundary conditions. Wind tunnel wall effects were included as was viscous drag. The detailed comparisons document the present status of the different methods.

N80-22277/1 PC **A03**/MF **A01**
Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
Flutter Instabilities in an Annular Cascade with Supersonic Relative Flow.
P. Salauen. 1979, 32p ONERA-NT-1979-3, ISSN-0078-379
Text in French; English Summary. Report Will Also Be Announced as Translation (Esa-TT-610).

A linearized three dimensional theory of the flow around a circular cascade of helical blades placed between two concentric cylinders was investigated. The relative flow was supersonic over the whole blade length, but the axial flow was subsonic. The influence of stagger angle, frequency, Mach number and number of blades on the stability of the first bending mode and the first torsion mode was studied. The first bending mode was always stable; the first torsion mode was usually unstable, but flutter was suppressed by reducing the number of blades, at least in the example considered.

N80-22278/9 PC **A07**/MF **A01**
Engineering Sciences Data Unit Ltd., London (England).
A Comparison of Various Numerical Methods for Calculating Supercritical Inviscid Isentropic Flow over Two-Dimensional Aerofoils.
R. H. Blockley. 1979, 150p S/T-MEMO-4/75, BR47382
Contract K/A72C/259/CB/A72C

Numerical solutions of full potential flow equations are mutually compared with particular reference to the method of Garabedian and Korn. Comparisons of pressure distributions and aerodynamic force and moment coefficients for a small range of airfoils at Mach numbers for near-critical or supercritical flow are presented. Procedures for using the Garabedian and Korn program are recommended. An approximate method (transonic small perturbation method based on Krupp and Murman) is similarly compared with that of Garabedian and Korn. The airfoils studied are described.

N80-22279/7 PC **A03**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
Three-Dimensional Viscous and Inviscid Separation of a Vortex Sheet from a Smooth Non-Slender Body.
F. T. Smith. Aug 78, 40p RAE-TM-AERO-3436, RAE-TR-78095

The local behavior of a vortex sheet near its (smoothly curved) line of separation from a smooth surface is examined from both the inviscid and viscous aspects, as well as for the general three-dimensional case. The inviscid behavior is first found for a special case, followed by the general inviscid case. The main inviscid requirement is that locally the normal distance of the vortex sheet from the surface must be proportional to the nth power of its normal distance from the separation line, where n can take the values 3/2, 5/2, 7/2, etc. The viscous (triple deck) account the three dimensional incompressible separation then singles out the value n = 3/2 as being the only consistent value, but with the coefficient of proportionality above being dependent on the Reynolds number. An appendix considers further local flow properties beneath the vortex sheet are considered, raising the possibility of a second viscous separation near the main separation line.

N80-22280/5 PC **A02**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
A Comment on the Origin of Endwall Interference in Wind Tunnel Tests of Aerofoils.
K. G. Winter, and J. H. B. Smith. 20 Aug 79, 20p RAE-TM-AERO-1816, BR70172

The interference effects of an airfoil spanning the working section of a wind tunnel due to the presence of boundary layers on the walls are discussed. Tests reveal behavior different from that predicted by theory. A qualitative assessment of the problem is made and it is suggested that the interference be explained in terms of changes in the displacement thickness of the boundary layers on the tunnel walls rather than in terms of induced effects from trailing vorticity.

N80-22281/3 PC **A03**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
Aerodynamic Characteristics of Moving Trailing-Edge Controls at Subsonic and Transonic Speeds.
D. G. Mabey, D. M. Mcowat, and B. L. Welsh. 25 Jun 79, 27p RAE-TM-STRUC-947, BR69932
Presented at AGARD Fluid Dyn. Panel Meeting on the Aerodyn. Characteristics of Controls, May 1979.

Oscillatory pressures calculated and measured at high subsonic speeds for a swept back wing of aspect ratio 6 with a part span trailing-edge flap are compared. The flap was driven at frequencies of 1 Hz (quasi-steady) and 90 Hz at Mach numbers from 0.40 to 0.95 with both fixed and free transition over a range of Reynolds numbers from one to four million. The measured oscillatory pressures which depend strongly on the boundary layer displacement thickness at the hinge line, are presented. Tests with the flaps driven simultaneously at two frequencies (90 Hz and 131 Hz) at subsonic and transonic speeds are discussed.

N80-22282/1 PC **A05**/MF **A01**
Aeronautical Research Inst. of Sweden, Stockholm. Aerodynamics Dept.
Measurement of Local Skin Friction and Static Pressure on a Swept Wing in Flight.
Final Report.
A. Bertelrud. Jul 79, 77p FFA-AU-1370
Contracts FMV-F-K-82223-76-001-21-001, FMV-F-K-82223-77-001-21-001
Prepared in Cooperation with Swedish Air Force, Stockholm.

A series of flight tests have been performed to explore the possibility of using multiple total head/static probes (modified Preston tubes) for the measurement of local skin friction and static pressure distribution in flight. The aircraft used in the experiment was a SAAB 32 A Lansen, which is a swept wing attack fighter. It is shown that the results obtained are reproducible and agree reasonably well with computations. Thin films (McCroskey gauges) mounted on the leading edge showed no deviations in resistance after 19 flights. This indicates that the gauges can be used for qualitative, and probably also quantitative measurements in flight.

N80-22633/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Status of Linear Boundary-Layer Stability and the E to the Nth Method, with Emphasis on Swept-Wing Applications.
J. N. Hefner, and D. M. Bushnell. Apr 80, 50p NASA-TP-1645, L-13313

The-state-of-the-art for the application of linear stability theory and the e to the nth power method for transition prediction and laminar flow control design are summarized, with analyses of previously published low disturbance, swept wing data presented. For any set of transition data with similar stream distrubance levels and spectra, the e to the nth power method for estimating the beginning of transition works reasonably well; however, the value of n can vary significantly, depending upon variations in disturbance field or receptivity. Where disturbance levels are high, the values of n are appreciably below the usual average value of 9 to 10 obtained for relatively low disturbance levels. It is recommended that the design of laminar flow control systems be based on conservative estimates of n and that, in considering the values of n obtained from different analytical approaches or investigations, the designer explore the various assumptions which entered into the analyses.

N80-22654/1 PC **A05**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (Germany, F.R.). Inst. fuer Experimentelle Stroemungsmechanik.
A Theoretical Investigation on the Effect of the Pressure Strain Correlations on the Development of Three-Dimensional Turbulent Boundary Layers.
J. C. Rotta. Feb 79, 77p DFVLR-FB-79-05
Text in German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-618).

Two approximate formulas relating to the process of shear stress generation in three dimensional turbulent boundary layers were derived. The derivation makes use of the assumption that the mean products of pressure and rate of strain fluctuations contribute substantially to the directional differences of the resultant shear stress and the resultant mean rate of strain. Calculations are presented for turbulent boundary layers on infinite swept wings and the results are compared with experimental data.

N80-22737/4 PC **A05**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Application of Two Design Methods for Active Flutter Suppression and Wind-Tunnel Test Results.
J. R. Newsom, I. Abel, and H. J. Dunn. May 80, 84p NASA-TP-1653, L-13177

The synthesis, implementation, and wind tunnel test of two flutter suppression control laws for an aeroelastic model equipped with a trailing edge control surface are presented. One control law is based on the aerodynamic energy method, and the other is based on results of optimal control theory. Analytical methods used to design the control laws and evaluate their performance are described. At Mach 0.6, 0.8, and 0.9, increases in flutter dynamic pressure were obtained but the full 44 percent increase was not achieved. However at Mach 0.95, the 44 percent increase was achieved with both control laws. Experimental results indicate that the performance of the systems is not so effective as that predicted by analysis, and that wind tunnel turbulence plays an important role in both control law synthesis and demonstration of system performance.

1B. Aeronautics

AD-A083 701/3 PC **A13**/MF **A01**
Air Force Aerospace Medical Research Lab Wright-Patterson AFB OH
Community Noise Exposure Resulting from Aircraft Operations. Volume 7. Acoustic Data on Aircraft Ground Runup Noise Suppressors.
Robert A. Lee. Dec 79, 282p Rept no. AMRL-TR-73-110-VOL-7
See also Volume 6, AD-A056 217.

This report presents the results of field measurements of the far-field noise produced on the ground by military aircraft operating inside Grade-II demountable suppressors during ground runup operations. For these ground runups, data are presented as a function of angle and distance to the aircraft. All of the data are normalized to standard acoustic reference conditions of 59 F temperature and 70% relative humidity. Volume 1 discusses the scope, limitations, and definitions needed to understand and use the volumes containing the noise data. Noise data are presented in this Volume 7 for the following aircraft suppressor systems: A-7 in the AF32A-19 and AF-32A-24 noise suppressors, KC-135A in the modified AF32A-52 noise suppressor, F-4 in the AF32A-14 noise suppressor, F-5 in the AF32A-18 noise suppressor, F-15 in the AF32A-23 nose suppressor, F-16 in the AF32A noise suppressor, F-100 in the AF32A-16 noise suppressor, F-106 in the AF32A-17 noise suppressor, F-111 in the AF32A-13 noise suppressor and T-38 in the AF32A-18 noise suppressor.

AD-A083 925/8 PC **A04**/MF **A01**
Royal Aircraft Establishment Farnborough (England)
Wind-Shear Encounters during Visual Approaches at Night. A Piloted Simulator Study.
Technical rept.,
P. L. Bisgood, J. W. Britton, and H. Y. Ratcliffe. Sep 79, 64p RAE-TR-79126, DRIC-BR-71911

A study was made in a fixed-base simulator of encounters with a variety of idealised wind-shears under conditions simulating a two-pilot approach, partly on instruments and partly visual, made at night. Twenty-five pilots, airline and Service, participated completing a total of 62 sorties, each of ten approaches. There were four shear encounters per sortie. The data comprised time-histories of each approach together with the pilots' responses to a detailed questionnaire and their spontaneous observations. Pilots were successful in recognising the absence of shear or the presence of severe shear. They were less successful in recognising shears of moderate intensity or in identifying the velocity components. They were prone to discern vertical draughts where none existed and may have been induced to do so by the compelling visual indications of vertical departure from the glide path given by the Precision Approach Path Indicator (PAPI). To cope effectively with the shears, pilot action had to be both prompt and appropriate and it was clear that pilots were quick to seek clues that might offer 'early warning' of impending shear. Many pilots commented on the value of participating in this study and it seems likely that the inclusion of shear encounters during routine simulator training may prove beneficial. (Author)

AD-A083 934/0 PC **A06**/MF **A01**
Air Force Aerospace Medical Research Lab Wright-Patterson AFB OH
USAF Bioenvironmental Noise Data Handbook. Volume 123. F-100D Aircraft, Near and Far-Field Noise.
Technical rept.,
Robert G. Powell. Aug 79, 105p Rept no. AMRL-TR-75-50-VOL-123
See also Volume 124, AD-A081 845 and Volume 1, AD-A031 865.

The USAF F-100D is a fighter aircraft powered by a J57-P-21 turbojet engine. This report provides measured and extrapolated data defining the bioacoustic environments produced by this aircraft operating on a concrete runup pad for four power conditions. Near-field data are reported for eight locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Far-field data measured at 19 locations are normalized to standard meteorological conditions and extrapolated from 75-8000 meters to derive sets of equal-value contours for these same seven acoustic measures as functions of angle and distances from the source.

AD-A083 986/0 PC **A06**/MF **A01**
ARINC Research Corp Annapolis MD
An Evaluation of Aircraft Separation Assurance Concepts Using Airline Flight Simulators. Volume I. Study Report.
Final rept.,
Bruce Morgenstern, and Thomas P. Berry. Nov 79, 108p 1343-01-3-2058-VOL-1, FAA/RD-79-124-1
Contract DOT-FA78WA-4091
See also Volume 2, AD-A083 897.

This report documents an evaluation of Aircraft Separation Assurance (ASA) concepts using an airline flight simulator. The primary objective of the experiment was to determine the cockpit information requirements for an aircraft collision avoidance system. Qualified pilots from commercial aviation and industry flew typical operational scenarios in the simulated Los Angeles area. During the flight, conflict situations with other aircraft developed, and pilots were asked to respond to these situations on the basis of information presented to them by one of three experimental collision avoidance displays. Computer-collected data on pilot response to collision avoidance commands and resultant miss distances were correlated with data from questionnaires filled out by participating pilots to determine the cockpit information requirements. The subjective commments addressed the areas of required display information items, use of color, audible alert, symbols, workload, pilot confidence in the system, and pilot display preference. Altitude, range, relative bearing, and other-aircraft heading have been identified as the most important and most essential information elements in the resolution of potential conflicts. The report provides a statistical analysis of the accumulated data and includes recommendations for the development and operational implementation of the ASA program. (Author)

AD-A084 042/1 PC **A07**/MF **A01**
Eaton Corp Deer Park NY AIL Div
Feasibility Study of TRISCAN Landing System.
Final rept.

Oct 77, 147p
Contract N00123-76-C-1129

The Navy Vertical Takeoff and Landing Project (NAVOTLAND) has been established to improve the hover, approach and landing capabilities of Navy and Marine Corps V/STOL aircraft. These aircraft may be required to operate from aviation facilities ships (non-aviation ships), small aviation ships (such as LPH, LHA, VSS) and Marine Corps tactical sites. Common problems in the aircraft missions include operations under severe weather, day and night, often requiring the landing in a confined area. The NAVTOLAND program will correlate and investigate the development of all systems and techniques which are involved in enabling the pilot to fly V/STOL Aircraft onto Navy Ships and Marine Corps tactical sites. Guidance sensors have been identified as being critical to the NAVTOLAND program. A guidance sensor is required to determine the three dimensional position of the V/STOL relative to the landing zone. In low visibility operations, sensors are needed to enable the pilot to locate the ship and initiate his approach; and if the landing site has zero ceiling, the guidance sensors will be required for the pilot to make the final approach. This points out the stringent accuracy requirements that must be achieved for the aircraft operations to be conducted safely. In particular, three dimensional accuracies for position of + or - 1 foot and range rate of 1 foot per second and an update rate of 10 times per second are required.

N80-22318/3 PC **A04**/MF **A01**
Defence Research Information Centre, Orpington (England).
Trials to Compare the Stopping Performance of Three Anti-Skid Systems and to Demonstrate Methods of Determining Aircraft Stop Distances on the Standard Military Reference Wet Surface.
I. Beaty, and R. W. Sugg. Oct 79, 64p S/T-MEMO-3/79, BR70264

Tests were conducted to determine if there was any difference in the stop distance of a BAC 1-11 aircraft under wet runway conditions when fitted with three different modern anti-skid systems. By comparing the aircraft stop distances at the mu-meter reading of .6 it was concluded that although the two more modern systems appeared to give the shorter distance, the difference was small and based on insufficient data points to give a high degree of confidence. The aircraft Braking Force Coefficient versus speed and mu-meter reading from one of the runs was used to demonstrate the use a method to determine the stop distance on the standard military reference wet surface at the weight at which the aircraft was tested. A method of deciding on the suitability of a test runway for aircraft/mu-meter braking trials using National and NATO standards are presented as well as recommendations on how to conduct the trials and how to determine mu-meter speed/friction curves for the test surface.

N80-22371/2 PC **A02**/MF **A01**
Defence Research Information Centre, Orpington (England).
A Means of Specifying a Standard Reference Wet Surface for Military Aircraft.
R. W. Sugg. Oct 79, 15p S/T-MEMO-1/79, BR70262

The British civil aircraft requirements (BCAR) method of aircraft certification under wet conditions and the correction of stopping distances to a standard using a friction trailer is studied. The method is also examined for military aircraft. The use of the standard to accident investigation procedures and NATO standards is discussed. A standard military reference wet surface and a way to correct aircraft performance to the standard are examined.

N80-22372/0 PC **A03**/MF **A01**
Defence Research Information Centre, Orpington (England).
An Investigation into Measuring Runway Surface Texture by the Grease Patch and Outflow Meter Methods.
R. W. Sugg. Oct 79, 33p S/T-MEMO-2/79, BR70263

A measurement of surface texture was used by some organizations as a means of specifying runway friction for stop distance calculations and certification purposes in spite of the conclusion by the American Society for Testing and Materials (ASTM) that it should be discontinued. A method of using surface texture to predict friction of ground vehicles at high speed was studied and it is concluded that within the limits found on runways it has only a very small effect on the prediction. It is recommended that where high speed prediction is necessary a more accurate method is to use equations based on test data. The difficulty in arriving at a single figure for surface texture was demonstrated by showing the variation that can occur along a runway and the large difference in readings between operators.

PATENT-4 194 244 Not available NTIS
Department of the Navy Washington DC
Angle Sensing System.
Patent,
Bernard L. Lewis. Filed 17 Aug 78, patented 18 Mar 80, 7p AD-D007 191/0, PAT-APPL-934 662 Supersedes PAT-APPL-934 662-78, AD-D005 327.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A system for measuring, in conjunction with a GCA radar, the crab angle of an aircraft which is making its landing approach above a runway. A loop antenna mounted on the craft transmit an audio-frequency electromagnetic wave to two sets of crossed receiving loops, each set mounted at one side of the runway. A line joining the centers of the loops makes a 45 deg angle with the plane of each loop. The outputs of the loops in each set are subtracted from each other, amplified, detected and rectified and then differentiated to provide a pulse output indicating the zero point of the subtraction, i.e., the time when the H-field vector is at an angle of 45 deg to the plane of each of the loops in the set providing the zero-indicating pulse output. The zero-indicating pulse outputs are fed to a time interval counter which determines the time interval between them. With this information plus the ground speed of the craft (as determined by the GCA radar) and the distance between the receiving-loop sets, the crab angle of the aircraft can be calculated. (Author)

PB80-811292 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Demands and Needs of Future Transportation: Air Transportation. 1968-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1968-Apr 80,
Edith Kenton. Jun 80, 294p
Supersedes NTIS/PS-79/0252 and NTIS/PS-78/0065.

The needs and demands for future air traffic control, airports, cargo aircraft, short takeoff aircraft, and air transportation in general are presented in this bibliography of Federally-funded research. Also included are studies on local air transportation needs and growth. (This updated bibliography contains 286 abstracts, 45 of which are new entries to the previous edition.)

1C. Aircraft

AD-A083 638/7 PC **A02**/MF **A01**
Rockwell International El Segundo CA North American Aircraft Div
Universal Alignment Equipment Study Results.
2 Apr 80, 23p Rept no. NA-80-90
Contract F33657-79-C-0783

Contents: Outline: Background; Universal Instruments; Elimination of Adapters; Instrument Technology Survey; Applications to Present, New Aircraft; Cost Effectiveness, Conclusions & Recommendations.

AD-A083 652/8 PC **A06**/MF **A01**
SKF Industries Inc King of Prussia PA
Small Portable Analyzer Diagnostic Equipment (SPADE) - Advance Development Prototype Report.
Final rept.,
David B. Board. Sep 79, 115p SKF-AL99Q016, USAAVRADCOM-TR-80-F-3
Contract DAAJ01-76-C-1073

The SPADE is an advanced development prototype of an off board aircraft bearing diagnostic equipment. The SPADE works on the shock pulse principle, which measures the kinetic impact and frictional energy within the tested component, independent of background vibration. The SPADE provides a highly accurate and trendable measurement of bearing condition that is independent of non-defect related background vibrations caused by the elastic motions f structures,rotors, gears, and shafts. The SPADE employs specialized signal conditioning and data processing techniques to measure frictional and shock energy associated with abrasive wear and dynamic impact of contaminated, pitted, spalled, corroded, or brinnelled bearing contact surfaces. This measured energy is then compared to present limits (stored in SPADE memory) that are representative of good, marginal, and discrepant conditions, and the status of the monitored component is displayed on the instrument's control panel. The unit has sufficient internal memory capacity to automatically process data from up to twenty-two (22) sensor locations on each of eight different aircraft models. It provides component condition readout in the form of a green (good), yellow (caution), or red (remove) light and a two digit percent degradation display to allow trending or discrepent component in the yellow (caution) zone. It is designed and packaged to survive the army field maintenance environment and can be operated by semi-skilled personnel. (Author)

AD-A083 653/6 PC **A07**/MF **A01**
Georgia Inst of Tech Atlanta School of Civil Engineering
Cavitation Damage Mechanisms: Experimental Study of Cavitation in a Spool Valve.
Final technical rept. Aug 77-Sep 79,
C. S. Martin, D. C. Wiggert, and H. Medlarz. Feb 80, 147p AFAPL-TR-79-2121
Contract F33615-77-C-2036

Cavitation has been investigated in directional control valves in order to identify damage mechanisms characteristic of components of aircraft hydraulic systems. Extensive tests were conducted in a representative metal spool valve and in a model three times larger. Both valves are well instrumented for the purpose of accurately measuring mean quantities as well as detecting the onset and extent of cavitation once it developed. Noncavitating data taken with both valves showed that the position of the high-velocity annular jet issuing from the orifice shifted orientation depending upon valve opening and Reynolds number. By means of high-frequency response pressure transducers strategically placed in the valve chamber of each test valve cavitation could be sensed by the correlation of noise with a cavitation index. Cavitation inception could be detected by comparing energy spectra for a fixed valve opening and a constant discharge. Another sensitive indicator of cavitation inception is the ratio of cavitating to non-cavitating spectral densities. The incipient cavitation index as defined in this investigation correlates well with the Reynolds number for both valves. Once cavitation develops, an accelerometer properly located on the cavitating component can be as sensitive to cavitation noise as a pressure transducer. Energy levels under developed cavitation were affected to some extent by temperature differences.

AD-A083 724/5 PC **A02**/MF **A01**
Developmental Sciences Inc City of Industry CA
Remotely Piloted Vehicle (RPV) Automatic Recovery System.
Final rept. Apr 78-Mar 79,
Kenneth L. Phillips, and Howard E. Krachman. 30 Mar 79, 21p Rept no. 14179
Contract DAAJ02-77-C-0050

A mini - RPV was tested utilizing up link and down link between a co-scanning ground station and an on-board autopilot to direct the RPV on its final approach to recovery. (Author)

AD-A083 864/9 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA

Parachute Techniques Employed in the Air-Launched Balloon System (ALBS) Development Program,
Andrew S. Carten, Jr., and Michael R. Wuest. 23 Mar 79, 5p Rept no. AFGL-TR-80-0142
Pub. in Jnl of Aircraft, v17 n2 p65-66 Feb 80.

No abstract available.

AD-A083 955/5 PC **A07**/MF **A01**
Boeing Vertol Co Philadelphia PA
Study of Cost/Benefit Tradeoffs Available in Helicopter Noise Technology Applications.
Final rept.,
R. H. Spencer, and H. Sternfeld, Jr. Jan 80, 128p FAA/EE-80-5
Contract DOT-FA78WA-4161

This study investigated cost/benefit tradeoffs using the case histories of four helicopters for which design and development were complete, and in three cases, have undergone substantial flight testing. The approach to quieting each helicopter was an incremental reduction of each source as required to obtain reductions in flyover noise with modifications to other secondary systems only as necessary. The methodology used to predict the effects of the design modifications on acquisition, maintenance, and operating costs were typical of those employed by rotorcraft manufacturers. The reduction of helicopter flyover noise generally was achieved through reductions in rotor tip speed. Performance characteristics were maintained to specified minimums for each aircraft in the study. (Author)

AD-A083 978/7 PC **A07**/MF **A01**
McDonnell Aircraft Co St Louis MO
F-4 Service Life Tracking Program (Crack Growth Gages).
Final rept. Feb 78-Sep 79,
C. R. Saff. Dec 79, 142p AFFDL-TR-79-3148
Contract F42600-78-D-0014

The objective of this program was to evaluate the ability of a crack growth gage to monitor potential crack growth damage in fatigue critical locations of F-4C/D aircraft structure. Crack growth gages were designed for use on the lower wing skin of F-4 aircraft. An element test program was performed to verify gage design and provide data for predicting gage behavior when attached to the fatigue test article. Results of those tests prompted performance of a supplemental test program to investigate effects of sheet thickness on crack growth retardation. Results from both of these test programs were used to develop procedures to predict crack growth in gages attached to the fatigue test article. Eight gages were bonded to the test article using room temperature cure adhesive after an elevated cure temperature adhesive failed. Results show gage crack growth is predictable. Analysis results demonstrate the monitoring potential of the gage. (Author)

AD-A084 073/6 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Aeronautical Knowledge (Selected Articles),
Qian Hongyuan, and Xu Xizhan. 14 Apr 80, 14p
Rept no. FTD-ID(RS)T-0281-80
Edited trans. of Hang K'ung Chih Shih (China) n2 p14-16 Feb 78, by H. P. Lee.

No abstract available.

N80-22265/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Theoretical Prediction of Nonlinear Propagation Effects on Noise Signatures Generated by Subsonic or Supersonic Propeller or Rotor-Blade Tips.
R. L. Barger. May 80, 18p NASA-TP-1660, L-13388

The nonlinear propagation equations for sound generated by a constant speed blade tip are presented. Propagation from a subsonic tip is treated as well as the various cases that can occur at supersonic speeds. Some computed examples indicate that the nonlinear theory correlates with experimental results better than linear theory for large amplitude waves. For swept tips that generate a wave with large amplitude leading expansion, the nonlinear theory predicts a cancellation effect that results in a significant reduction of both amplitude and impulse.

N80-22304/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Preliminary Investigation of Motion Requirements for the Simulation of Helicopter Hover Tasks.
R. V. Parrish. Apr 80, 31p NASA-TM-81801

Data from a preliminary experiment are presented which attempted to define a helicopter hover task that would allow the detection of objectively-measured differences in fixed base/moving base simulator performance. The addition of heave, pitch, and roll movement of a ship at sea to the hover task, by means of an adaption of a simulator g-seat, potentially fulfills the desired definition. The feasibility of g-seat substitution for platform motion can be investigated utilizing this task.

N80-22305/0 PC **A09**/MF **A01**
Science Applications, Inc., Los Angeles, CA. Economic Analysis Div.
Parametric Study of Helicopter Aircraft Systems Costs and Weights.
M. N. Beltramo. Jan 80, 179p NASA-CR-152315
Contract NAS2-8703

Weight estimating relationships (WERs) and recurring production cost estimating relationships (CERs) were developed for helicopters at the system level. The WERs estimate system level weight based on performance or design characteristics which are available during concept formulation or the preliminary design phase. The CER (or CERs in some cases) for each system utilize weight (either actual or estimated using the appropriate WER) and production quantity as the key parameters.

N80-22306/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Aerodynamics of the New Generation of Combat Aircraft with delta Wings.
M. P. Bohn. Mar 80, 26p NASA-TM-75793, AGARD-CP-241
Contract NASW-3198
Transl. Into English of "Aerodynamique de la Nouvelle Generation d'Avions de Combat a Aile delta", Rept. Agard-Cp-241 AGARD, Paris (France), Jun. 1978 p 11-1-11-13. Translation Was Announced as N78-30106. Transl. By Scientific Translation Service, Santa Barbara, Calif. Presented at the Multi-Panel Symp. On Fighter Aircraft Design, Florence, 3-6 Oct. 1977.

The use of delta wing aerodynamic design for modern fighter aircraft is discussed. Various current French fighter airplanes are utilized for comparisons.

N80-22315/9 PC **A04**/MF **A01**
European Space Agency, Paris (France).
Investigations into an Active Vibration Isolation System for Helicopters with Rigid and Elastic Airframe Modeling.
J. Skudridakis. 1979, 73p ESA-TT-531, DLR-IB-552/78-6
Transl. Into English of "Untersichung Zu Einen Aktiven Schwingungsisolationssystem fuer Hubschrauber bei Starrer und Elasticher Zellenomodellierung", Rept. Dlr-Ib-552-78-6 Dfvlr, Brunswick (Germany, F.R.). Jun. 1978.

A system for active rotor isolation was investigated to compensate for blade number harmonic excitation of the rotor and limit the static relative movement of the rotor drive unit. Several sensor configurations were studied for the first completed regulator design of a single rigid function model with a modified Riccati design. This single axis computer model was reviewed and extended for the elastic helicopter airframe modeling (by means of a modified Riccati design). Computer results show that the active rotor isolation is superior in design to all known passive rotor isolation systems. The regulators designed for the single axis computer model show very good isolation of vibration at the 4- and 8- fold rotation frequencies of the rotor, in conjunction with rapid swinging. In addition, the separation between the rotor drive unit and the airframe was reduced with an additional load factor.

N80-22316/7 PC **A04**/MF **A01**
Aeronautical Research Inst. of Sweden, Stockholm. Aerodynamics Dept.
A Practical Method for Predicting Roughness Effects on Aircraft.
A. Bertelrud. Nov 78, 54p FFA-AU-1413
Contract SWEDBTD-71.348-U-253

A method for prediction of the extra drag due to surface roughness on aircraft is described. The method is based on use of a number of working charts for flow parameters and includes charts for the drag increments due to different types of roughness. In the introductory part, the flow around wings is described with emphasis on the variation of flow characteristics with flight conditions.

N80-22317/5 PC **A11**/MF **A01**
European Space Agency, Paris (France).
Civil Component Program Wing Section. Predimensioning of a Supercritical Wing.
R. Arndt. Jul 79, 226p ESA-TT-542, BMFT-FB-W-77-38
Transl. Into English of "Ziviles Kommponentenprogramm 'Flugelsektion' - Vordimensionierung Eines Flugels MIT Ueberkritischem Profil", Rept. Bmft-FB-W-77-38 Dfvlr, Cologne and Mbr G.M.B.H., Hamburg (Germany, F.R.). Nov. 1977. Original Report in German Previously Announced as X79-72062.

To achieve an optimal wing structure with respect to stringer and rib pitch and their cross-sectional shape, an estimated dimensioning of 700 mm rib pitch based upon the structure optimization program 'Dascha' for rigid load cases was written. The coordinates are calculates from the contour program 'Geolan', based on the wing profile MBB A1-725-146 and using the wing geometry of the ZKP basic design 3 (A 300 B 10 X-2). The dimensioning estimate was made in relation to rigid load cases. To obtain a minimum of structure, this estimation should be repeated with other pitches and cross-sectional shapes. The elastic load cases which result in greater sectional sizes can then be taken into consideration.

N80-22319/1 PC **A05**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (Germany, F.R.). Inst. fuer Flugmechanik.
In-Flight Handling Qualities Investigation of Airbus a 310 Dlc. Configurations on Landing Approach Using the Dfvlr-Hfb 320 Variable Stability Aircraft.
D. Hanke. Feb 79, 87p DFVLR-FB-79-18
Text in German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-630).

In-flight simulation of the longitudinal and lateral/directional dynamics of the Airbus A 310 aircraft using the DFVLR-HFB 320 variable stability aircraft was studied. The evaluation of different spoiler direct lift controls (DLC) concepts for longitudinal control was stressed. The influence of these concepts handling qualities and pilot-vehicle performance under real instrument landing systems (ILS) approach environmental conditions was determined. Sixty-three ILS approaches were flown by two pilots evaluating four aircraft/DLC configurations. The main handling quality parameter for DLC enhanced longitudinal control is the flight path to pitch attitude phase. A new general applicable flight path to pitch attitude phase criteria is proposed.

N80-22320/9 PC **A03**/MF **A01**
Aeronautical Research Inst. of Sweden, Stockholm. Aerodynamics Dept.
Roughness Effects on Fuel Consumption for Two Commercial Aircraft: Mcdonnell Douglas DC-9 and DC-10.
Final Report.
A. Bertelrud. Oct 79, 48p FFA-AU-1456
Contracts SWEDBTD-77-4869, SWEDBTD-78-5543

The effects of surface roughness on the fuel consumption of two typical passenger aircraft, McDonnell Douglas DC-9 and DC-10, are estimated. Typical cruise conditions and flights for the two aircraft types are considered. The roughness effects are estimated at two levels of sophistication; comprehensive and simplified. In the detailed approach

the inviscid flow field around the wings is analyzed by means of a transonic, small perturbation code. The boundary layer is calculated with Bradshaw a straight-tapered swept wing code (with provision for distributed roughness). The simplified approach is basically a flat-plate analysis, which in many cases gave nearly the same results as the more sophisticated approach.

N80-22321/7 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Pilot Assessment of Two Computer-Generated Display Formats for Helicopter Instrument Approach.
F. R. Niessen, P. L. Deal, and J. M. Patton, Jr. May 80, 40p NASA-TM-80151, L-13136

Two computer generated display formats were evaluated as primary displays by six research pilots in a fixed base simulator. One of the computer generated display formats was an electronic attitude director indicator (EADI) which featured three cue flight director, command information, superimposed on true perspective runway symbology. The other computer generated display format featured separate horizontal and vertical situation information with vector predictors. A baseline display, consisting of an electromechanical attitude director indicator (ADI) with a three cue flight director and a moving map, was used as a reference for the pilot evaluations.

N80-22356/3 PC **A02**/MF **A01**
Joint Inst. for Advancement of Flight Sciences, Hampton, VA.
Effect of a Flexibly Mounted Store on the Flutter Speed of a Wing.
Final Report.
H. L. Runyan. Apr 80, 25p NASA-CR-159245
Grant NSG-1438

A passive system proposed for increasing the flutter speed of a wing with heavy concentrated weights involves the concept of mounting the store on a pitch pivot having a very low pitch stiffness relative to the wing stiffness. This concept was investigated utilizing a two dimensional approach involving 4 degrees of freedom, namely, wing bending, wing torsion, store pitch and store vertical translation. This preliminary analysis was very encouraging and the results demonstrate that, if the uncoupled store pitch frequency was below the wing bending frequency, the flutter speed was greatly increased. A second more complete analysis was developed utilizing a three dimensional structure, but retaining the two dimensional, incompressible unsteady airforces of Theodorsen. The details of the analysis are included.

N80-22357/1 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Aeroelastic and Structures Research Lab.
The Design, Testing and Evaluation of the MIT Individual-Blade-Control System as Applied to Gust Alleviation for Helicopters.
Final Report.
R. M. Mckillip, Jr. Feb 80, 92p NASA-CR-152352, ASRL-TR-196-1
Grant NSG-2266

A type of active control for helicopters was designed and tested on a four foot diameter model rotor. A single blade was individually controlled in pitch in the rotating frame over a wide range of frequencies by electromechanical means. By utilizing a tip mounted accelerometer as a sensor in the feedback path, significant reductions in blade flapping response to gust were achieved at the gust excitation frequency as well as at super and subharmonics of rotor speed.

N80-22358/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Description of an Experimental (Hydrogen Peroxide) Rocket System and Its Use in Measuring Aileron and Rudder Effectiveness of a Light Airplane.
T. C. Obryan, M. W. Goode, F. D. Gregory, and M. H. Mayo. May 80, 42p NASA-TP-1647, L-12494

A hydrogen peroxide fueled rocket system, which is to be used as a research tool in flight studies of stall and spin maneuvers, was installed on a light, four place general aviation airplane. The pilot controlled rocket system produces moments about either the roll or the yaw body axis to augment or oppose the aerodynamic forces and inertial moments acting on the airplane during various flight maneuvers, including the spin. These controlled moments of a known magnitude can be used in various ways to help analyze and interpret the importance of the various factors which influence airplane maneuvers. The rocket system and its installation in the airplane are described, and the results of flight rests used to measure rudder and aileron effectiveness at airspeeds above the stall are presented. These tests also serve to demonstrate the operational readiness of the rocket system for future research operations.

N80-22394/4 PC **A10**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Transonic Pressure and Load Distributions for a Group of Simulated Launch Vehicles.
T. C. Kelly. Apr 80, 216p NASA-TM-80195, L-13365

Pressure and load distributions for a related group of simulated launch vehicle configurations are presented. The configurations were selected so that the nose cone and interstage transition flare components were relatively close to one another and subject to mutual interference effects. Tests extended over a Mach number range from 0.40 to 1.20 at angles of attack from 0 deg to about 10 deg. The test Reynolds numbers, based on main stage diameter, were of the order of 0.00000098.

N80-22749/9 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
Fatigue Crack Propagation in Aluminum Alloy Sheet Materials under Maneuver Spectrum and Constant Amplitude Loading.
R. J. H. Wanhill. Jun 78, 25p NLR-MP-78025-U
Submitted for Publication Sponsored in Part by Royal Netherlands Air Force Directorate of Material.

Aluminum alloy sheets were compared for fatigue crack propagation resistance under maneuver conditions and constant amplitude loading. Results of stress levels, crack growth rate, delta k value, and fracture toughness for each alloy are presented.

PAT-APPL-6-135 057 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Langley Station, VA.
Decoupler Pylon: Wing/Store Flutter Suppressor.
Patent Application,
W. A. Reed, III. Filed 28 Mar 80, 18p N80-22359/7, NASA-CASE-LAR-12468-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A device for suspending a store from a support such as an aircraft wing is described. It comprises soft-spring means whereby the store pitch mode is decoupled from support modes and a low frequency active control mechanism which maintains store alignment. In the described embodiment, a pneumatic suspension system both isolates the store in pitch and, under conditions of changing mean load, aligns the store with the wing to which it is attached. The device allows the flutter speed of an aircraft flying with an attached store to be increased while reducing the sensitivity of flutter to changes in the pitch inertia and center of gravity location of the store.

1D. Aircraft Flight Control and Instrumentation

N80-22363/9 PC **A03**/MF **A01**
European Space Agency, Paris (France).
Control System Design Using Vector-Valued Performance Criteria with Application to the Control Rate Reduction in Parameter Insensitive Control Systems.
G. Kreisselmeier. Dec 78, 39p ESA-TT-512-REV, DLR-FB-77-55-REV
Transl. Into English of "Reglerentwurf MIT Vektoriellen Guetekriterien und Seine Praktische Anwendung Zur Stellgeschwindigkeitsreduktion bei Parameterunempfindlichen Reglern", Rept. Dlr-FB-77-55 Dfvlr, Oberpfaffenhofen, Nov. 1977. Original Report in German Previously Announced as X79-71736.

A design strategy is suggested which uses for the optimization of the control system, a vector-valued performance-criterion such that a systematic step-by-step improvement of the performance vector is achieved, i.e., at each stage the performance of some components is improved without impairing that of the others, so that finally the optimal design is obtained. This technique is used to design a parameter-insensitive flight-path controller which, compared with earlier designs, has both a larger reduction in sensitivity and a considerable reduction in the maximal control rate. The design shows that a controller can have considerably reduced sensitivity without increasing the demands on the actuator system. This result is due primarily to the control rate being directly considered in the design. The controller-synthesis technique based on vector-valued performance-criteria as here suggested is feasible even when the number of design aspects is large.

N80-22364/7 PC **A03**/MF **A01**
Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
Definition of a Two Level Control System for Nonlinear Aircraft Motion.
A. Kirszenblat. 1979, 34p ONERA-NT-1979-7, ISSN-0078-3781
Text in French; English Summary. Report Will Also Be Announced as Translation (Esa-TT-614).

The utilization of fly by wire control systems is discussed in terms of the improvement of aircraft handling qualities. An approach to the problem of defining a control law well adapted to the whole flight envelope is presented. This system has a two level structure allowing a task oriented control and an augmentation of the aircraft stability. A nonlinear model of the aircraft dynamics is described incorporating the inertial coupling term, and the nonlinear aerodynamic effects. The model generates a trajectory, a reference control law vector, and an output vector which tracks a vector. This vector represents the maneuvering objectives assigned by the pilot at any time. A servo compensation which subordinates the aircraft motion to the model is also given. The control law is obtained by application of the optimal linear control theory to local linear models of the aircraft. Direct force control surfaces were easily incorporated in the computation of the control system.

N80-23008/9 PC **A06**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Validation Methods Research for Fault-Tolerant Avionics and Control Systems: Working Group Meeting, 2.
J. W. Gault, K. S. Trivedi, and J. B. Clary. 1980, 105p NASA-CP-2130, L-13716
Meeting Held at Hampton, VA. 3-4 Oct. 1979.

The validation process comprises the activities required to insure the agreement of system realization with system specification. A preliminary validation methodology for fault tolerant systems documented. A general framework for a validation methodology is presented along with a set of specific tasks intended for the validation of two specimen system, SIFT and FTMP. Two major areas of research are identified. First, are those activities required to support the ongoing development of the validation process itself, and second, are those activities required to support the design, development, and understanding of fault tolerant systems.

1E. Air Facilities

PB80-811052 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Air Traffic Congestion and Capacity. 1964-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Apr 80,
Guy E. Habercom, Jr. Jun 80, 193p
Supersedes NTIS/PS-79/0594 and NTIS/PS-78/0598.

Present and predicted air traffic density and capacity, both enroute and in airport environments, is analyzed in these research reports. Terminal area scheduling, runway queueing, and airspace regulation are discussed. (This updated bibliography contains 186 abstracts, 14 of which are new entries to the previous edition.)

2. AGRICULTURE

2B. Agricultural Economics

PB80-182579 PC **A06**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
Energy and U.S. Agriculture: 1974 and 1978,
David Torgerson, and Harold Cooper. Apr 80, 120p STATISTICAL BULL-632
See also report dated Sep 76, PB-260 485.

Agricultural production used approximately 8.5 billion gallons of liquified fuel in 1978. This was up from the nearly 8 billion gallons in 1974. Fuel oil and liquified petroleum (LP) gas usage remained relatively constant between 1974 and 1978. The most dramatic changes were in diesel and gasoline usage. Gasoline use dropped about 0.2 billion gallons and diesel fuel use increased almost 0.7 billion gallons, accounting for the net 0.5 billion gallon increase in liquid fuel usage. Onfarm business use of natural gas and electricity showed virtually no change between 1974 and 1978.

PB80-182751 PC **A04**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Statistical Research Div.
Forecasting Corn Yields: A Comparison Study Using 1977 Missouri Data,
Carol C. House. Jun 79, 72p

Two different approaches to forecasting corn yields are compared using data collected in nine Missouri fields in 1977. One approach involves the use of nonlinear regression techniques to fit growth data to a logistic model. This approach requires the use of only current season data to produce biological grain yield forecasts. The report discusses several model variations free of least square model assumption violations. The second approach applies historically estimated linear regression parameters to current season data to calculate yield. Examination of the models shows similar forecasting abilities with acceptable forecasting errors one month before maturity. An upward bias is found in final estimates of net yield.

2C. Agricultural Engineering

AD-A083 693/2 PC **A04**/MF **A01**
Ohio Agricultural Research and Development Center Wooster
Economic and Land Management Analysis in Honey Creek Watershed.
Final rept.,
D. Lynn Forster, and Gary S. Becker. 1977, 71p
Contract DACW49-77-C-0200

The Lake Erie Wastewater Management Study is to develop a recommended management program for the Lake Erie Basin. A major part of this program is to be a management program for agricultural sources of pollution. This report is an economic analysis of alternative strategies for controlling nonpoint source pollution in the Honey Creek Watershed. This watershed is located in north central Ohio and is thought to be representative of much of north central and northwestern Ohio, major sources of nonpoint agricultural pollution in Lake Erie. Earlier studies have pointed to sediment and phosphorus loadings as being critical pollutants in Lake Erie. In addition, previous work has inventoried existing farm management practices and alternative farm management practices which reduce pollutant loadings. The intent of this study is to identify the relationships between farm income and the major pollutants, soil loss and phosphorus loss.

E80-10094 PC **A05**/MF **A01**
Fort Lewis Coll., Durango, CO.
Development of a Winter Wheat Adjustable Crop Calendar Model.
Final rept.,
James R. Baker. 31 Dec 79, 84p NASA-CR-160447
Contract NAS9-15276

The author has identified the following significant results. Least squares techniques were applied for parameter estimation of functions to predict winter wheat phenological stage with daily maximum temperature, minimum temperature, daylength, and precipitation as independent variables. After parameter estimation, tests were conducted using independent data. It may generally be concluded that exponential functions have little advantage over polynomials. Precipitation was not found to significantly affect the fits. The Robertson triquadratic form, in general use for spring wheat, yielded good results, but special techniques and care are required. In most instances, equations with nonlinear effects were found to yield erratic results when utilized with averaged daily environmental values as independent variables.

PB80-177066 PC **A02**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
Solar-Assisted Combination Grain Drying: An Economic Evaluation.
Agricultural economic rept.,
Walter G. Heid, Jr. May 80, 20p AER-453

A solar-assisted combination grain drying system could result in a 53-percent savings in fossil fuel under optimum conditions. It must be integrated into the planned harvest schedule and other farm energy needs for profitable results. Savings under the most favorable conditions studied showed a 6.6-percent return on investment. Solar collectors costing more than $10 per square foot will likely find little acceptance in a combination drying system at current fossil fuel prices.

PB80-178577 PC **A14**/MF **A01**
Department of Agriculture, Washington, DC.
Physico-Chemical Basis of Grain Milling,
Y. N. Kupritz. 1980, 317p TT-77-53388
Trans. of mono. Fiziko-Khimicheskie Osnovy Razmola Zerna, Moscow, 214p 1946. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.Portions of this document are not fully legible.

This monograph is the first attempt towards the complex investigation of the grain milling processes. The experimental material of the grain studies due to similar investigations in the connected areas, has enabled the authors to draw some generalized inferences, making it possible to approach closer to the theory of grain milling processes and to identify the physico-chemical principles of these processes.

PB80-181050 PC **A04**/MF **A01**
Kansas Water Resources Research Inst., Manhattan.
Application of Continuous Hydrologic Modeling to Evaluate and Design Wastewater Land Disposal or Evaporation Systems.
Project completion rept. 1 Oct 77-30 Sep 79,
Jerome J. Zovne. Mar 80, 54p W80-04804, OWRT-A-090-KAN(1)
Contract DI-14-34-0001-8018

The hydrologic design of land treatment systems has largely been accomplished by annual or semi-annual estimates of the disposition of the input wastewater load. The operation of these systems is, however, dependent upon daily variations in precipitation, evaporation, and land treatment/irrigation area water management. The subject of this report is a hydrologic model which has been developed to design these systems based upon a continuous simulation of the daily water budget of a storage pond and irrigation disposal area system. The user of this program would need to identify a nearby weather station having long-term daily precipitation and temperature records. He would also need to identify the soil type in the disposal area, and specify the storage pond size, the irrigation disposal rate, the crop or cover on the disposal area, and the level of available soil moisture when irrigation ceases. The model monitors the daily pond level fluctuations and overflows; soil moisture, runoff, and percolation in the disposal area; and gives monthly and annual summaries of all hydrologic variables.

PB80-181357 PC **A04**/MF **A01**
South Dakota State Univ., Brookings. Water Resources Research Inst.
Development of Animal Waste Facilities for Minimizing Water Pollution.
Completion rept.,
John L. Wiersma. Mar 80, 71p W80-04811, OWRT-A-036-SDAK(1)
Contract DI-14-31-0001-3542

Three methods for controlling water pollution from animal wastes in feedlots are presented. The first method involves confining all wastes and water to the feedlot area until maximum decomposition occurs. The second method involved the use of a minimum area for the feedlot to favor decomposition and treatment of wastes. A system of diversion ditches and drying terraces was used to handle runoff and wastes from a sloped lot. Sample wells were used to study groundwater flow and quality near the terraces. The third method involves the return of feedlot wastes to the land at a rate that does not inhibit full crop production.

PB80-182140 PC **A03**/MF **A01**
Delaware Univ., Newark. Water Resources Center.
The Use of the Climatic Water Budget in Irrigation Scheduling: Iowa.
Rept. no. 2,
John R. Mather, and Anthony DeNardo. Jul 78, 33p W80-04876, OWRT-A-040-DEL(7)
Contract DI-14-34-0001-9008
Also issued as part of Volume XXXI, No. 2, 1978, Publications in Climatology, C. W. Thornthwaite Associates, Laboratory of Climatology, Elmer, New Jersey.

Scheduling the correct amount of supplemental irrigation is a problem facing all irrigators. While various techniques have been developed to permit calculation of time and amount of irrigation needs, most are so complex or require so many data that they cannot be evaluated by the individual farmer or irrigation operator. A simplified irrigation scheduling procedure using average information on the climatic demand for water (evapotranspiration) and the precipitation as measured at the particular irrigation site is described.

2D. Agronomy and Horticulture

PB80-180920 PC **A02**/MF **A01**
California Univ., Davis. Water Resources Center.
Management of Summer-Seasonal Irrigation Water in Beef Cow/Calf Agriculture in the Sierra Nevada Foothills.
Technical completion rept.,
Charles A. Raguse, and William A. Williams. Mar 80, 10p W80-04803, OWRT-B-175-CAL(5)

Efficient agricultural production in the Sierra Nevada foothills is generally achieved only through the use of the grazing animal. Economically this region has a comparative advantage, for the production of beef calves, over regions of intensive agriculture. Grazing is also an appropriate biological tool for land management in the nonagricultural interests of the general public. Use of seasonally available irrigation water for perennial and annual forages was evaluated in terms of biological yield and economic feasibility.

PB80-181589 MF **A01**
Montana Agricultural Experiment Station, Bozeman.
Soil Genesis, Hydrological Properties, Root Characteristics and Microbial Activity of 1- to 50-Year Old Stripmine Spoils.
Final rept. Oct 75-Jun 78,
W. M. Schafer, G. A. Nielsen, D. J. Dollhopf, and K. Temple. Apr 79, 233p USDA/SEA/CR-2, EPA-600/7-79-100
Available microfiche only because of poor quality.

Reclamation of coal strip-mined land is a major environmental concern. The future of reclaimed land depends on the long-term stability of the soil-vegetation system on mined land. To evaluate some of the possible changes that occur in mine soils through time; soil genesis, water flow patterns, root development, and microbial activity were studied on natural soils and 1- to 50-year-old minesoils. Similar soil development processes occur in both minesoils and natural soils, but because mine soils

have a different origin, they will probably always remain different than natural soils. Differences in water flow patterns on minesoils and natural soils were attributed to plant community and soil textural differences.

PB80-182124 PC **A03**/MF **A01**
Delaware Univ., Newark. Water Resources Center.
Corn Response to Ammoniacal Nitrogen Under Varying Levels of Magnesium and Potassium Fertility.
Technical completion rept.,
M. R. Teel, W. H. Mitchell, A. L. Morehart, and D. K. Brauer. Apr 80, 35p W80-04871, OWRT-A-039-DEL(1)
Contract DI-14-34-0001-8008

Eight nitrogen treatments, varying with respect to nitrogen source (ammonium versus nitrate), and method of application, were compared with corn (Zea May L.) under four levels of potassium (0, 50, 100 and 200 lbs. K20/acre/yr as KCl) within each of three lime regimes (no lime, dolomitic, or calcitic lime). The research was conducted during the growing seasons of 1976-1979. Salient data from the 1978 and 1979 seasons are reported.

2E. Animal Husbandry

PB80-184195 PC **A25**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Veterinary Science.
National Brucellosis Technical Commission Report: Appendices A through J.
Rept. for Feb 76-Aug 78,
R. K. Anderson, David T. Berman, W. T. Berry, John A. Hopkin, and Robert Wise. 28 Aug 78, 585p
See also basic report, PB-288 380. Sponsored in part by Animal and Plant Health Inspection Service, Washington, DC. Veterinary Services, and United States Animal Health Association, Richmond, VA.

The report reviews in depth the concept of eradicating brucellosis from the U.S. cattle population. It finds the goal biologically feasible using effective control and surveillance techniques. Importance of an emergency plan to deal with reintroduction of disease is noted. Essential knowledge for achieving eradication is available, says report, although producers and others often lack information needed to participate in an effective program. Investment in a coordinated eradication program is unequivocally cost beneficial, says report. Report commends stepped-up research aimed at improving diagnosis and immunization techniques. Noting need for better epidemiological and economic data for administrative decision-making, report calls for research initiatives into these areas. A nonduplicative individual animal identification system is identified as key to implementing various program flexibilities desired by industry. Report calls attention to public health benefits attainable by eradication, noting continued risk to certain occupational groups as long as disease remains in livestock. A regulatory system that provides incentives to farmers and others by establishing a warranty for all sales or transfers of breeding cattle is proposed. Report says Market Cattle Identification (MCI) should not the the sole means of detecting brucellosis in beef herds.

2F. Forestry

PB80-181324 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Taper-Based System for Estimating Stem Volumes of Upland Oaks.
Forest Service research paper (Final),
Donald E. Hilt. 1980, 17p NEFES/80-66, FSRP-NE-458

A taper-based system for estimating stem volumes is developed for Central States upland oaks. Inside bark diameters up the stem are predicted as a function of dbhib, total height, and powers of relative height. A Fortran IV computer program, OAKVOL, is used to predict cubic and board-foot volumes to any desired merchantable top dib. Volumes of test trees were predicted with acceptable accuracy. Other uses for the taper-based system are discussed.

PB80-181464 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Sugar Maple Provenance Study: West Virginia Outplanting-10-Year Results.
Forest Service reseach paper (Final),
G. W. Wendel, and W. J. Gabriel. 1980, 11p FSRP-NE-460, NEFES/80-67

After 10 years, survival of sugar maple (Acer saccharum) provenances outplanted in West Virginia did not differ significantly. Total height, height growth, and dbh measurements were significantly different among provenances. Fifty percent of the trees had major forks below 9.0 feet. Thirty-eight percent of the trees had no forks but 71 percent of these were in the intermediate or overtopped crown class. Forking was not related to provenance. Latitude, longitude, and elevation of provenances were not strongly correlated with provenance performance.

PB80-181803 PC **A02**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Evaluation of Several Methods of Applying Sewage Effluent to Forested Soils in the Winter.
Forest Service research paper (Final),
Alfred Ray Harris. Mar 79, 13p FSRP-NC-162

Surface application methods result in heat loss, deep soil frost, and surface ice accumulations; subsurface methods increase heat loss and produce shallower frost. Distribution of effluent within the frozen soil is a function of surface application methods, piping due to macropores and biopores, and water movement due to temperature gradients. Nitrate is not renovated.

PB80-182421 PC **A07**/MF **A01**
Pacific Southwest Forest and Range Experiment Station, Berkeley, CA.
The Sierra Ecology Project. Volume IV. Bibliography of the Environmental Effects of Weather Modification,
James L. Smith, and Neil Berg. Jun 79, 143p
Contract DI-6-07-DR-20010
See also Volume 1, PB-284 900.

As part of the Sierra Ecology Project, 1361 citations relating weather modification activities to environmental responses were gathered from nationally recognized abstracting services and from the Bureau of Reclamation, U.S. Department of Interior, Denver, Colorado and the Pacific Southwest Forest and Range Experiment Station, Forest Service, U.S. Department of Commerce, Berkeley, California. The citations are divided into 25 topical categories, including biological, hydrological, geological processes, effects of weather modification upon cultural systems, inadvertent weather modification, and seeding agents. The contents emphasize environmental responses to wintertime orographic seeding in which snow, rather than rain is the primary result. Key term, author, and geographical indexes supplement the numbered citation listing.

PB80-811102 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Clearcutting and Harvesting Operations. 1964-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-May 80,
Robena J. Brown. Jun 80, 70p
Supersedes NTIS/PS-79/0579 and NTIS/PS-78/0365.

Clearcutting methods and effects are cited in this bibliography of Federally-sponsored research. The following topics on clearcutting and harvesting are covered: Mechanized equipment, full forest harvesting, foliage utilization, reforestation, slope erosion and stabilization, lightwood formation, forest regeneration, wood products yield, residues, salvage, and management. (This bibliography contains 63 abstracts, 11 of which are new entries to the previous edition.)

3. ASTRONOMY AND ASTROPHYSICS

3A. Astronomy

AD-A083 860/7 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Cloudcroft Observatory Today,
Timothy J. Schneeberger, S. P. Worden, J. L. Africano, and E. Tyson. 1980, 3p Rept no. AFGL-TR-80-0114
Pub. in Sky and Telescope, v59 p109-110 Feb 80.

No abstract available.

AD-A083 861/5 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Digital Speckle Interferometry to Measure the Angular Diameters of Faint Objects,
Gene Hubbard, Mike Reed, Peter Strittmatter, Keith Hege, and Simon P. Worden. Jan 79, 10p Rept no. AFGL-TR-80-0111
Pub. in High Angular Resolution Stellar Interferometry, The Proceedings of Colloquium Number 50, International Astronomical Union, held at University of Maryland, College Par, Maryland, 30 August-1 September 1978, p28-1-28-7 1978.

No abstract available.

N80-23230/9 PC **A05**/MF **A01**
European Space Agency, Paris (France).
Extreme Ultraviolet/X-Ray Sky Survey Mission: Report on the Phase A Study.
Dec 79, 91p ESA-SCI(79)9

The program objectives, and implementation of the mission are analyzed. The satellite and its subsystems and the telescopes are described. The survey operations include the capability to search for EUV point and nebular sources in the pass band 100 to 1000 Angstroms, and to map with high resolution the diffuse emission known to exist in the band 10 to 250 Angstroms.

N80-23231/7 PC **A05**/MF **A01**
European Space Agency, Paris (France).
Hipparcos Space Astrometry: Report on the Phase A Study.
Dec 79, 95p ESA-SCI(79)10

The HIPPARCOS mission is compared with other astrometric techniques. The payload, the spacecraft and the mission are described. Scientific data processing and the management and time schedule is presented. The mission aims at the accurate measurement of the trigonometric parallaxes, proper motions, and positions of about 100,000 selected stars. The expected average mean error is about 0.002 arc second for all angular measurements. The total scheduled time from project approval to launching is approximately 6 years.

3B. Astrophysics

AD-A083 856/5 PC **A02**/MF **A01**
Illinois Univ At Urbana-Champaign Dept of Astronomy
The 10 February 1977 Lunar Occultation of Uranus, Radius, Limb Darkening, and Polar Brightening at 6900 A,
Richard R. Radick, and William C. Tetley. 18 Sep 78, 9p AFGL-TR-80-0117
Grant NGR-14-005-176
Pub. in ICARUS, v40 p67-74 1979.

No abstract available.

AD-A083 857/3 PC **A02**/MF **A01**
California Univ Los Angeles Dept of Astronomy
A New Technique for Measuring Solar Rotation,
Edward J. Rhodes, Jr., Franz-Ludwig Deubner, and Roger K. Ulrich. 18 Apr 78, 11p AFGL-TR-80-0112
Grants NsG-7158, NSF-AST76-20260
Pub. in the Astrophysical Jnl., v227 n2 p269-637, 15 Jan 79, and UCLA Astronomical Papers, v17 n33 n.d. Prepared in cooperation with California Inst. of Tech., Pasadena. George W. Downs Lab. of Physics.

No abstract available.

AD-A083 858/1 PC **A02**/MF **A01**
Joint Inst for Lab Astrophysics Boulder CO
Stellar Model Chromospheres. IX. Chromospheric Activity in Dwarf Stars,
Walter L. Kelch, Jeffrey L. Linsky, and Simon P. Worden. 18 Sep 78, 15p AFGL-TR-80-0106
Contract NAS5-23274, Grant NGL-06-003-057
Pub. in the Astrophysical Jnl., v229 p700-712, 15 Apr 79.

No abstract available.

AD-A083 918/3 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Linear Stability of Self Similar Flow. 7. The Primakoff Blast Wave and Its Generalizations.
Memorandum rept.,
I. B. Bernstein, and D. L. Book. 3 Mar 80, 33p
Rept no. NRL-MR-4182
See also AD-A070 709.

The linear stability of those Sedov blast wave similarity solutions for which the flow is homologous behind the shock, of which the best-know example is the Primakoff point blast model, along with that of their two-dimensional counterparts, is proved analytically. This conclusion in the three-dimensional case applies to all perturbations, and in the two-dimensional case to flutelike (kz = 0) modes. Implications for supernova remnant evolution are discussed. (Author)

DOE/TIC-11096 PC **A07**/MF **A01**
Tennessee Univ., Knoxville.
Determination of Primordial and Cosmogenic Radioactivity in Achondritic Meteorites by Low-Level, gamma-Ray Spectrometry.
R. A. Muntean. Aug 79, 140p
Contract EY-76-C-05-0033
Thesis.

A high-sensitivity, low-background gamma-ray spectrometer containing two 23 cm by 13 cm thallium-activated, sodium iodide detectors was used to measure long-lived primordial and cosmogenic radioactivity in a suite of achondritic meteorites. Potassium, thorium, uranium, and exp 26 Al abundances were established for sixteen brecciated eucrites, two unbrecciated eucrites, a nakhlite, a chassignite, and a unique meteorite from Antarctica by nondestructive counting techniques. In several cases, multiple samples of the same meteorite fall were examined. Concentrations ranged from 79.8 ppM to 1150 ppM for potassium, 55.6 ppb to 663 ppb for thorium, 18.1 ppb to 190 ppb for uranium, and 45.0 dpm/kg to 99.0 dpm/kg for exp 26 Al. In addition, a exp 137 Cs concentration of 264 dpm/kg was observed in the Allan Hills 77005,9 specimen. (ERA citation 05:016962)

IC-77-60 MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
New Bundle-Completion for Parallelizable Spacetimes.
C. T. J. Dodson. Jul 77, 11p
U.S. Sales Only. Microfiche copies only.

The Schmidt (9) b-boundary deltaM, for completing a spacetime M has several desirable features. It is uniquely determined by the spacetime metric in an elegant geometrical manner. The completed spacetime is average M MUdeltaM, where average M average 0 exp + M/0 exp + and average 0M is the Cauchy completion (with respect to a topological metric induced by the Levi-Civita connection) of a component of the orthonormal frame bundle having structure group 0 exp + . Then deltaM consists of the endpoints of incomplete curves in M which have finite horizontal lifts in average 0 exp + M, and if deltaM = theta we say that M is b-complete. It turns out that M is b-complete if and only if 0 exp + M is complete. This criterion for spacetime completeness is stronger than geodesic completeness and Beem (1) has shown that this remains so even for the restricted class of globally hyperbolic spacetimes. Clarke (3) has shown that for such spacetimes the curvature becomes unbounded as the b-boundary is approached. Now, if deltaM different from theta then average 0 exp + m may contain degenerate fibres, leading to the quotient topology for average M being non-Hausdorff as well as precluding a manifold structure. Precisely this has been demonstrated by Boshard (2) for Friedmann spacetime, casting doubt on the physical significance of the completion. For, the only neighbourhood of the Friedmann singularity is the whole of average M and, in the closed model, initial and final singularities are identified in deltaM. Similarly, Johnson (7) showed that the completion of Schwarzschild spacetime is non-Hausdorff because of degenerate fibres in average 0 exp + M. Here a modification of the Schmidt procedure is introduced which appears to be useful in avoiding fibre degeneracy and in promoting a Hausdorff completion. The modification is to introduce and explicit vertical component into exp + M by reference to a standard section, that is to a parallelization. (Atomindex citation 10:434116)

JINR-E-2-10545 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Lepton Mixing and the "Solar Neutrino Puzzle".
S. M. Bilenky, and B. Pontecorvo. 1977, 11p
U.S. Sales Only.

The results of the well known solar neutrino experiment of Davis et al. are discussed, in which the Cl-Ar method is used. The result of the experiment, a too small neutrino signal (the so-called "solar neutrino puzzle"), has been tentatively accounted for in a number of quite exotic explanations. It appears that the explanation in terms of lepton mixing and neutrino sterility is quite attractive from the point of view of present day elementary particle physics and is much more natural than the other explanations of the "puzzle". (Atomindex citation 09:406157)

LUIP-7802 MF **A01**
Lund Univ. (Sweden). Fysiska Institutionen.
Test of Katz's Track Formation Theory on Isotopic Measurements of the Cosmic Radiation in the Element Interval Be-Mg.
S. Behrnetz, and N. Y. Herrstroem. Apr 78, 17p
LUNFD6-NFFK-7002-1-11(1978)
U.S. Sales Only. Microfiche copies only.

The delta-ray theory of track formation developed by Katz and coworkers is applied to isotopic measurements in nuclear emulsion for the elements in the interval beryllium through magnesium. The charge dependence of certain parameters of the theory is studied. The result obtained indicates a discrepancy between our experimental values and the theory. This is difficult to interpret and it is not possible to say where the disagreement between theory and experiment appears. (Atomindex citation 09:406307)

N80-23007/1 PC **A02**/MF **A01**
Stanford Univ., CA. Inst. for Plasma Research.
Uncertainty in Estimates of the Number of Extraterrestrial Civilizations.
P. A. Sturrock. Mar 80, 16p NASA-CR-162637, SUIPR-808
Contract NGR-05-020-668

An estimation of the number N of communicative civilizations is made by means of Drake's formula which involves the combination of several quantities, each of which is to some extent uncertain. It is shown that the uncertainty in any quantity may be represented by a probability distribution function, even if that quantity is itself a probability. The uncertainty of current estimates of N is derived principally from uncertainty in estimates of the lifetime of advanced civilizations. It is argued that this is due primarily to uncertainty concerning the existence of a Galactic Federation which is in turn contingent upon uncertainty about whether the limitations of present-day physics are absolute or (in the event that there exists a yet undiscovered hyperphysics) transient. It is further argued that it is advantageous to consider explicitly these underlying assumptions in order to compare the probable numbers of civilizations operating radio beacons, permitting radio leakage, dispatching probes for radio surveillance for dispatching vehicles for manned surveillance.

N80-23110/3 PC **A03**/MF **A01**
California Inst. of Tech., Pasadena. Space Radiation Lab.
Research in Particles and Fields.
Semiannual Status Report, 1 Apr. 1979 - 31 Mar. 1980.
R. E. Vogt, A. Buffington, L. Davis, Jr., and E. C. Stone. 1980, 44p NASA-CR-162994
Contract NGR-05-002-160

The astrophysical aspects of cosmic and gamma rays and the radiation environment of the Earth and other planets investigated by means of energetic particle detector systems flown on spacecraft and balloons are discussed. The theory of particles and fields in space is also addressed with particular emphasis on models of Saturn's magnetic field.

N80-23227/5 PC **A03**/MF **A01**
Cornell Univ., Ithaca, NY. Center for Radiophysics and Space Research.
Studies in Occultation Astronomy.
Final Report, 1 Feb. 1975 - 31 Mar. 1979.
J. Veverka. May 80, 46p NASA-CR-163006
Grant NSG-7126

Major scientific results are summarized for the following studies: (1) observations of the 8 April 1976 occultation of epsilon Geminorum by Mars; (2) studies in occultation techniques; and (3) the March 1974 occultation of Saturn by the Moon. A re-analysis of the 1974 lunar occultation of the Titan indicates that Titan is strongly limb darkened, with D approximately greater than 5800km; there is internal evidence in the data that Titan's atmosphere is inhomogeneous; and that observations are inconsistent with any sample homogeneous model atmosphere which matches the P (lambda) and Beta (lambda) observations of Titan.

N80-23229/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
X-Ray Observations of ALGOL.
N. E. White, S. S. Holt, R. H. Becker, E. A. Boldt, and P. J. Serlemitsos. Mar 80, 14p NASA-TM-80670
Submitted for Publication.

Observations of Algol using a solid state spectrometer onboard the Einstein Observatory are discussed. Two observations six months apart were made, both during a primary optical eclipse. No corresponding X-ray eclipses were seen. During the second observation the source was flaring and was on average a factor three brighter. The spectrum on both occasions was consistent with a two-component thermal equilibrium model with temperatures of approximately 7.5 and 40 million degrees. Attempts to insert a third component indicate the temperature distribution to be bimodal. Models for the X-ray emission are discussed and it is suggested that the emission most likely originates from an active corona surrounding the K star.

N80-23238/2 PC **A04**/MF **A01**
European Space Agency, Paris (France).
The Flux Gate Magnetic Field Experiment E2 in Helios A and B: Technical Description.
G. Musmann. Jul 79, 67p ESA-TT-540, BMFT-FB-W-77-09
Transl. into English of "Das Foerstersonden-Magnetfeldexperiment E2 in Helios A und B: Technische Beschreibung", Rept. Bmft-FB-W-77-09 Dfvlr, Cologne (Germany, F.R.) and Technische Univ., Brunswick (Germany, F.R.). Dec. 1977. Original Report in German Previously Announced as X79-72253.

The basic features of the three axis vector magnetometer used on HELIOS space probes for the E2 experiment are described with emphasis on the sensor and electronic system. The experiment includes not only continuously observing the interplanetary magnetic field, but also measuring its spiral structure and discontinuous appearance. The analog-digital conversion of the measured voltages, the flipper, the time average computer, the shock identification computer, and data processing techniques are discussed.

N80-23239/0 PC **A03**/MF **A01**
Planetary Science Inst., Tucson, AZ.
Phobos and Deimos: Analysis of Surface Features, Ejecta Dynamics and a Volatile Loss Mechanism.
Final Report.
D. R. Davis, C. R. Chapman, R. Greenberg, and S. J. Weidenschilling. Mar 80, 26p NASA-CR-163005

Contract NASW-3272

The question of whether the crater population on Phobos represents a production population or an equilibrium population is considered. The absolute ages of cratered surfaces are interpreted and analyzed. A computer program was developed to study the dynamics of material ejected from Martian satellites and to investigate the hypothesis that at least some of the extensive set of linear features discovered on the surface of Phobos could be the result of secondary cratering from the Stickney impact. The possibility that Deimos was catastrophically disrupted by a large impact but subsequently reaccreted is considered as well as the probability the Phobos had an impact nearly large enough to disrupt it are also discussed.

N80-23240/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Venera-11 and Venera 12: Preliminary Estimates for the Wind Speed and Turbulence in the Atmosphere of Venus.
V. V. Kerzhanovich, M. Y. Makarov, F. Marov, M. K. Roshdestvenskiy, and V. P. Sorokin. Aug 79, 20p NASA-TM-75726
Transl. Into English of "Venera-11 I Venera-12: Predvaritelnyye Otsenki Skorosti Vetra I Turbulentosti V Atmosfere Venery" Rept. Acad. Of Sci. USSR, Moscow, 1979 p 1-21. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

The methods and results of measurements for wind speed and atmospheric turbulence in the clouds of Venus are described, and compared with earlier results. The distribution of wind speed obtained from the data of Venera 12 is in good conformity with the data of the preceding Venera and Pioneer probes, indicating the existence of a constant and powerful zonal movement of the troposphere.

N80-23241/6 PC **A02**/MF **A01**
California Inst. of Tech., Pasadena.
Elemental Composition of Solar Energetic Particles in 1977 and 1978.
W. R. Cook, E. C. Stone, R. E. Vogt, J. H. Trainor, and W. R. Webber. 1979, 7p NASA-CR-162927, SRL-79-8
Contracts NAS7-100, NGR-05-002-169
Presented at 16TH Intern. Cosmic Ray Conf., Kyoto, Japan, 6-18 Aug. 1979.

The elemental composition of energetic nuclei from seven major solar flare events were measured wit the cosmic ray detector systems aboard the Voyager 1 and 2 spacecraft. The energetic nuclei abundances differ significantly from those of photospheric material. They are enhanced relative to the photonsphere by a factor which is the ratio of abundance of an energetic nuclei species (relative to oxygen) over the corresponding abundance of photospheric material. This factor is common to all events and has a nonmonochromatic characteristic dependence on nuclear charge. This factor is roughly ordered by first ionization potential into two groups of elements, metallics and volatiles.

N80-23246/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Cosmic Ray Studies with a Gas Cherenkov Counter in Association with an Ionization Spectrometer.
V. K. Balasubrahmanyan, J. F. Ormes, J. F. Arens, F. Siohan, and G. B. Yodh. Jan 80, 24p NASA-TM-80639
Submitted for Publication.

The results from a balloon-borne gas Cherenkov counter (threshold 16.5 GeV/nucleon) and an ionization spectrometer are presented. The gas Cherenkov counter provides an absolute energy distribution for the response of the calorimeter for 5 or = Z 26 nuclei of cosmic rays. The contribution of scintillation to the gas Cherenkov pulse height was obtained by independently selecting particles below the gas Cherenkov threshold using the ionization spectrometer. Energy spectra were derived by minimizing the chi squared between Monte Carlo simulted data and flight data. Best fit power laws, dN/dE = AE-gamma, were determined for C, N, O, Ne, Mg, and Si. The power laws, all consistent with E (-2.7) are not good fits to the data. A better fit is obtained using the spectrum derived from the spectrometer. The data from the ionization calorimeter and the gas Cherenkov are thus completely self-consistent.

N80-23247/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
The Cosmic X-Ray Background.
E. A. Boldt. Mar 80, 42p NASA-TM-80659
Presented at the 155TH Meeting, AM. Astron. Soc., San Francisco, 15 Jan. 1980.

The cosmic X-ray experiment carried out with the A2 instrument on HEAO-1 made systematics-free measurements of the extra-galactic X-ray sky and yielded the broadband spectral characteristics for two extreme aspects of this radiation. For the apparently isotropic radiation of cosmological origin that dominates the extragalactic X-ray flux (3 keV), the spectrum over the energy band of maximum intensity is remarkably well described by a thermal model with a temperature of a half-billion degrees. At the other extreme, broadband observations of individual extragalactic X-ray sources with HEAO-1 are restricted to objects within the present epoch. While the non-thermal hard spectral components associated with unevolved X-ray emitting active galaxies could account for most of the gamma-ray background, the contribution of such sources to the X-ray background must be relatively small. In contrast, the 'deep-space' sources detected in soft X-rays with the HEAO-2 telescope probably represent a major portion of the extragalactic soft X-ray (3 keV) backgoround.

N80-23248/1 PC **A02**/MF **A01**
California Inst. of Tech., Pasadena.
Satellite Measurements of the Isotopic Composition of Galactic Cosmic Rays.
R. A. Mewaldt, J. D. Spalding, E. C. Stone, and R. E. Vogt. 1979, 7p NASA-CR-162923, PAPER-OG-7-2
Contract NGR-05-002-160
Presented at the 16TH Intern. Cosmic Ray Conf., Kyoto, Japan, 6-18 Aug. 1979.

The individual isotopes of galactic cosmic ray Ne, Mg, and Si at 100 MeV/nucleon were clearly resolved with an rms mass resolution of 0.20 amu. The results suggest the cosmic ray source is enriched in Ne-22, Mg-25, and Mg-26 when compared to the solar system. The ratio of (Mg-25)+(Mg-26) to Mg-24, which is approximately 0.49 compared to the solar system value of 0.27, suggest that the cosmic ray source and solar system material were synthesized under different conditions.

PB80-177983 Not available NTIS
National Bureau of Standards, Washington, DC.
The Behavior of H alpha in Delta Cephei.
Final rept.,
G. Wallerstein. Dec 79, 3p
Pub. in Journal of Publ. Astron. Soc. Pacific 91 p772-724 Dec 79.

A new radial velocity curve for Delta Cephei is presented based on 10 A/mm red spectrograms. The curves for neutral metallic lines, low excitation ions, and high excitation Si II lines follow the curve of Shane (1958) within observational uncertainties. For H alpha the curve shows an amplitude 15 km/s larger than for the metallic lines. Arguments are presented to show that the H alpha absorption is formed high in the atmosphere of Delta Cephei.

PB80-178387 Not available NTIS
National Bureau of Standards, Washington, DC.
Outer Atmospheres of Cool Stars. IV. A Discussion of Cool Stellar Wind Models.
Final rept.,
B. M. Haisch, J. L. Linsky, and G. S. Basri. 1980, 15p
Sponsored in part by National Aeronautics and Space Administration, Washington, DC. See also PB80-159114.
Pub. in Astrophys. Jnl. 235, p519-533, 15 Jan 80.

Possible wind models for late-type stars which appear not to have hot coronae and transition regions are investigated. Taking Arcturus as the prototypical star, wind models with T<20,000 K are considered and for solutions with mass loss rates of the order of one billionth of a solar mass per year are sought.

PB80-178395 Not available NTIS
National Bureau of Standards, Washington, DC.
Observations of the Quiescent Corona, Transition Region, and Chromosphere in the dMe Flare Star Proxima Centauri.
Final rept.,
B. M. Haisch, and J. L. Linsky. 1980, 5p
Contracts NAS5-23274, NAS8-33333
Pub. in Astrophys. Jnl. 236, pL33-L37, 15 Feb 80.

X-ray fluxes and ultraviolet spectra (1175-3200 A) of the dM5e flare star Proxima obtained with the imaging proportional counter on HEAO 2 and the ultraviolet spectrographs on IUE are presented. These observations are the first concrete evidence for a quiescent corona in an M dwarf outside of flares.

PB80-178858 Not available NTIS
National Bureau of Standards, Washington, DC.
Microwave Dielectric Measurements of Lunar Soil with a Coaxial Line Resonator Method.
Final rept.,
H. E. Bussey. 1979, 8p
Sponsored in part by National Aeronautics and Space Administration, Washington, DC.
Pub. in Proceedings of Lunar and Planetary Science Conference (10th), Houston, TX, March 19-23, 1979, p2175-2182 Dec 79.

A method is given for sensitive dielectric measurements at a series of microwave frequencies using a section of coaxial line. The line is used as a 1-port cavity resonator; it resonates when the electrical length of the center conductor (which is open circuited at each end) equals 1, 2..., N half-wavelengths. The dielectric properties of an Apollo 17 dried soil sample were measured in vacuum over a temperature range of 173 to 373 K.

PB80-182272 Not available NTIS
National Bureau of Standards, Washington, DC.
Nucleosynthetic Yields and the History of the Stellar Birthrate.
Final rept.,
J. C. Wheeler, G. E. Miller, and J. M. Scalo. 1980, 5p
Sponsored in part by National Science Foundation, Washington, DC.
Pub. in Jnl. Astron. Astrophys., v82 p152-156, 1980.

The rate of production of metals is recomputed using the constant mass stellar models of Arnett (1978) and the stellar birthrate of Miller and Scalo (1979), which has a higher birthrate for massive stars. Massive stars produce an appropriate amount of metals if the stars lose negligible mass and if the birthrate is constant. With constant mass evolution and a higher past birthrate, metals would be over-produced. Chiosi (1979) has shown that mass loss decreases the yield of massive stars. In this case massive stars can account for the observed metal abundances only if the birthrate were significantly higher in the past in contradiction to independent evidence that it is nearly constant.

PB80-186133 PC **A05**/MF **A01**
National Geophysical and Solar-Terrestrial Data Center, Boulder, CO.
Solar-Geophysical Data Number 426, February 1980. Supplement. Explanation of Data Reports.
Feb 80, 92p SGD-426-SUPPL, NOAA-80040905
See also PB80-186158, and PB80-186141.

This supplement contains the description and explanation of the data in the monthly publication, Solar-Geophysical Data, compiled by the National Geophysical and Solar-Terrestrial Data Center in Boulder, Colorado. Solar-Geophysical Data is intended to keep research workers informed on a timely schedule of the major events of solar activity and the associated interplanetary, ionospheric, radio propagation, and other geophysical effects.

PB80-186141 PC **A09**/MF **A01**
National Geophysical and Solar-Terrestrial Data Center, Boulder, CO.
Solar-Geophysical Data Number 426, February 1980. Part I (Prompt Reports). Data for January 1980, December 1979.
Feb 80, 180p SGD-426-PT-1, NOAA-80040903

See also Part 2, PB80-186158, Supplement, PB80-186133, and PB80-166218.

In addition to an index for 1979-1980, this prompt report provides data for January 1980 on: alert periods, daily solar indices, solar flares, solar radio emission, spacecraft observations, solar wind measurements, inferred interplanetary magnetic field polarities, mean solar magnetic field, coronal holes, and the Boulder Geomagnetic Substorm Log. It also provides data for December 1979 on: daily solar activity center, sudden ionospheric disturbances, spacecraft observations, solar radio emission, cosmic rays, geomagnetic indices, and radio propagation indices. This issue also has a section on late data: solar wind measurements December 1979, solar radio emission November and December 1979, solar x-ray radiation October 1979, and cosmic rays October, November 1979.

PB80-186158 PC **A03**/MF **A01**
National Geophysical and Solar-Terrestrial Data Center, Boulder, CO.
Solar-Geophysical Data Number 426, February 1980. Part II (Comprehensive Reports). Data for August 1979.
Feb 80, 50p SGD-426-PT-2, NOAA-80040904
See also Part 1, PB80-186141, Supplement, PB80-186133, and PB80-166226.

In addition to an index for 1979-1980, this issue of comprehensive reports provides data for August 1979 on: solar radio emission, energetic solar particles and plasma, and solar x-ray radiation. Solar Flare data are now eleven months delayed from date of observation, rather than the usual six months. A delay in the final listing of solar flare data also delays the Daily Flare Index, the Regional Flare Index and the Abbreviated Calendar Record. The miscellaneous data includes the energetic solar particles July 1979, active regions March 30 - July 17, 1979, and synoptic solar maps March 30 - July 17, 1979.

RRK-78-18 PC **A02**/MF **A01**
Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics.
Propagators for a Quantized Scalar Field in a Static Closed Universe.
H. Nariai, and T. Azuma. Jul 78, 17p
U.S. Sales Only.

In a previous paper, a massive scalar field in an expanding closed universe was canonically quantized by taking full account of its coupling-type with the background universe and of the latter's topological (spherical or elliptic) nature. General formulae (including the parts of vacuum fluctuation which should after all be removed by a suitable regularization) for the energy density and pressure of the quantized medium were derived. Various propagators for the quantized scalar field were also dealt with, because the Feynman propagator in particular became important as soon as the pair-creation of those particles was called for. However, there will be an intimate relation between the former hydrodynamic quantities and the pair-creation of their constituents. Accordingly, this problem is studied in detail by adopting a static closed universe (for simplicity in the reduction of various expressions derived in the previous paper) and examining the behavior of various bi-scalar propagators in the universe. (Atomindex citation 10:489592)

3C. Celestial Mechanics

JINR-E-2-11291 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Classical Dynamical Systems with the Symmetry of the Kepler Problem.
V. I. Karloukovski. 1978, 9p
U.S. Sales Only.

The Hamiltonian dynamical systems of the form of H=1/2G sub 1 p exp 2 +1/2G sub 2 (xp) exp 2 +G sub 3 (xp)+U, where Gsub(j) and U are functions of r= sqrt x exp 2 , are investigated. The notion of the strict Kepler symmetry is introduced to single out the cases where there is the Runge-Lenz vector quadratic in the momentum. All dynamical systems with this property are found. They depend on an arbitrary function of the distance to the centrum of symmetry and two arbitrary interaction constants. The equations of motion are solved and it is shown explicitly that the orbits are closed. Cases when the strict Kepler symmetry is related to an underlying E(3) symmetry are noted. The breaking of the strict Kepler symmetry and its relation to the precession of the perihelion are discussed. (Atomindex citation 10:431224)

4. ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A083 862/3 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Electrodynamic Structure of the Late Evening Sector of the Auroral Zone,
W. J. Burke, D. A. Hardy, F. J. Rich, M. C. Kelley, and M. Smiddy. 14 Jun 79, 17p Rept no. AFGL-TR-80-0134
Pub. in Jnl. of Geophysical Research, v85 nA3 p1179-1193, 1 Mar 80.

No abstract available.

AD-A083 885/4 PC **A09**/MF **A01**
Photometrics Inc Lexington MA
Assessment of Rocketborne and Airborne Infrared Data.
Final rept. 1 Dec 77-31 Oct 78,
I. L. Kofsky, D. P. Villanucci, and W. S. Andrus. 30 Nov 78, 176p PHM-09-78, HAES-79, DNA-4731F, AD-E300 744
Contract DNA001-78-C-0093

Past DNA/AFGL aircraft data on 2.8 micron-band emission from the auroral particle-irradiated atmosphere were systematically evaluated, and a detailed plan was formulated for measuring its spatial-temporal variations with a radiometer of much higher angular and intensity resolution and for interpreting this structure in terms of aeronomy code models. Data from HAES-program sounding rocket A18.219-1 are presented that show a large, unexpected enhancement of the near-limb 4.2-4.3 micron radiance 90 km altitude closely associated in time and space with energy input from incoming charged particles. In addition energy deposition within the field of the interferometric spectrometer HIRIS II was calculated from optical (and incoherent-scatter radar) data taken at ground stations; SWIR radiometry results from another rocket probe were found to be consistent with results from other HAES investigations; and infrared/optical measurements of concentrations of minor species important in atmospheric deionization are suggested (in three Appendixes). Most, but not all, of the enhancements in radiation from the zenith atmosphere near 2.8 micron measured by the aircraft's wide-field radiometer show no statistically-significant difference from one another. Interpreted as nitric oxide overtone emission, the energy yield of the complete vibrational-cascade sequence derived from this subset is 0.4 (sub 5)%.

AD-A083 908/4 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Addition of an Aerosol Transmission Model to the Aeronautical Systems Division Infra-Red Emission Prediction Program (ASDIR).
Master's thesis,
Allen C. McLellan. Mar 79, 112p Rept no. AFIT/GAE/AA/79M-3

The Aeronautical Systems Division Infra-Red Emission Program (ASDIR) is a large computer program used to predict hot surface and plume emissions from a geometrically modeled target. The atmospheric transmission segment of the program included only the major gaseous absorbers (H2O, CO2, and N2O) with no aerosol attenuation. To improve the flexibility of the program in making more accurate predictions at low altitudes, an aerosol transmission computational scheme was written for the ASDIR code. Using the basic methodology in the transmission model LOWTRAN 4, a subroutine, was written for direct inclusion into ASDIR. Curve fits of the following LOWTRAN parameters were performed which simplified the aerosol procedures and minimized the additional computer storage and time requirements in ASDIR: assumed aerosol particle densities, equivalent sea level path lengths for vertical paths - AV(z), and total sea level extinction coefficients for an 'average continental' and 'maritime' aerosol models. Results of the new subroutine (called HAZE) compared very well with LOWTRAN's aerosol predictions. A logic change was included in HAZE to automatically select a maritime aerosol model under low visibility conditions. This programming change was prompted by results of a recent Grafenwohr, FRG transmission study.

AD-A083 927/4 PC **A03**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Prediction of Energetic Particle Disturbances,
G. A. Paulikas, D. N. Baker, W. R. Barron, V. Domingo, and P. R. Higbie. 1979, 49p Rept no. AFGL-TR-80-0105
Pub. in Solar-Terrestrial Predictions Proceedings, v2 p415-463 1979.

No abstract available.

KGI-79-1 PC **A03**/MF **A01**
Kiruna Geofysiska Inst. (Sweden).
Some Recent Results from European Sounding Rocket and Satellite Observations of the Hot Magnetospheric Plasma.
B. Hultqvist. Mar 79, 40p
U.S. Sales Only.

A brief summary of some recent results from European studies of the hot magnetospheric plasma is presented. The material is organized in four main sections: 1) Observations of keV auroral electrons. 2) Observation of the hot ion component of the magnetospheric plasma. 3) Sudden changes of the distribution of the hot plasma in the dayside magnetosphere. 4) Banded electron cyclotron harmonic instability in the magnetosphere - a first comparison of theory and experiment. (Atomindex citation 10:489526)

N80-22907/3 PC **A02**/MF **A01**
Old Dominion Univ. Research Foundation, Norfolk, VA.
The Contribution of Molecular Relaxation in Nitrogen to the Absorption of Sound in the Atmosphere.
Final Report.
A. J. Zuckerwar, and R. W. Meredith. Apr 80, 18p NASA-CR-162928, PTR-80-4
Grant NSG-1324

Results and statistical analysis are presented for sound absorption in N2-H2O binary mixtures at room temperature. Experimental procedure, temperature effects, and preliminary results are presented for sound absorption in N2-H2O binary mixtures at elevated temperatures.

N80-22914/9 PC **A03**/MF **A01**
Danish Meteorological Inst., Copenhagen.
Occurrences of the Polar Slant E Condition (SEC) at Narssarssuaq, Godhavn, Thule, 1976.
I. S. Primdahl. 1977, 46p ISBN-87-7478-145-6

Tables of slant E condition (both certain and doubtful cases) scaled from the ionograms of Thule, Godhavn, and Narssarssuaq for the year 1976 are presented in the form of monthly data sheets.

N80-22915/6 PC **A02**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (Germany, F.R.). Inst. fuer Physik der Atmosphaere.
Some Results of Preliminary Tests About the Contrast Values Sky to Sea (Visible Horizon) in Dependence on Environmental Parameters.
H. E. Hoffmann. Mar 79, 24p DFVLR-FB-79-10
Text in German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-623).

The luminance of air and sea waters in the Baltic Sea was measured from a helicopter at heights of 15 m, 30 m, and 45 m. The measurements, which allowed a calculation of the contrast between air and sea as a function of various environmental parameters, are presented. The contrast was dependent on the angle between sunlight and measuring apparatus and on the height of the sea waves.

N80-22924/8 PC **A10**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

The Stratcom 8 Effort.
E. I. Reed. Apr 80, 221p NASA-TP-1640

The ozone-nitrogen oxides ultraviolent flux interactions were investigated to obtain data on stratospheric photochemistry. The balloon, rocket, and aircraft operations are described along with the instruments, parameter measurements, and payloads.

N80-22931/3 PC **A08**/MF **A01**
European Space Agency, Paris (France).
New Approximate Equations for the Saturation Pressure of Water Vapor and for Humidity Parameters Used in Meteorology.
W. Boegel. Jan 79, 158p ESA-TT-509, DLR-FB-77-52
Transl. Into English of "Neue Naeherungsgleinchungen fuer den Saettigungsdruck des Wasserdampfes und fuer die in der Meteorologie Gebraeuchlichen Luftfeuchte-Parameter", Rept. Dlr-FB-77-52 Dfvlr, Oberpfaffen, (Germany, F.R.), Oct. 1977. Original Report in German Previously Announced as X79-72011.

Approximate equations for the saturation pressure of water vapor in the pure as a function of temperature, for the corresponding inverse functions, and for some real-gas correction factors, based on the Goff-Gratch formulation were developed because the Groff-Gratch formulation of the thermodynamic properties of moist air, used by the World Meteorological Organization (WMO) as a basis for the calculation of humidity parameters, is often too complicated for direct applications. These amplified equations are used to establish methods for calculating the most important humidity parameters, e.g. dew-point temperature, relative humidity, mixing ratio etc. These methods, consisting for the most part of simple formulae, are tailored for meteorological applications, without assuming perfect gases.

N80-22933/9 PC **A06**/MF **A01**
Physics Lab. RVO-TNO, The Hague (Netherlands).
Aerosol Measurements During Spring 1978: Their Size Distributions and Optical Properties in Visible and Infrared Wavelength Regions.
M. J. M. Vandeven. Oct 78, 102p PHL-1978-41, TDCK-71515

Daily aerosol measurements performed north of the Hague are described. The majority of the aerosol spectra, with sizes between 0.163 and 18 micrometers, appear to be composed of a superposition of a continental and a maritime aerosol. The optical properties of the aerosols are investigated also, by a monostatic Mie-lidar at 1.06 micrometers. The resulting extinction and backscatter are compared with the values of these scattering parameters calculated from Mie theory. There is good agreement for the extinction at visibilities beyond one kilometer. Foggy weather shows a much higher value for the extinction coefficient as calculated from Mie theory. The backscatter is about a factor of five larger for Mie theory. For 0.55, 0.6943, 5.0 and 10.6 micrometers the same parameters were calculated in order to give an idea about spectral behavior of the sampled aerosols.

N80-22935/4 PC **A05**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (Germany, F.R.). Inst. fuer Physik der Atmosphaere.
Optical and Atmospheric Optical Parameters During Visibility Tests in Northern Germany, 1977.
H. E. Hoffmann. Jun 79, 94p DFVLR-MITT-79-06
Text in German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-615).

Measurements of the inherent contrast of a 1.5 ton truck and a minesweeper were carried out using a photometer mounted in a helicopter. The results of the measurements are presented in diagrams and tables as a function of the background, the illumination of the target region, the angle of elevation, the time of day, the angle of azimuth, and the degree of cloud cover.

PB80-181753 PC **A04**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
A Multidirectional Photodiode Array for the Measurement of Solar Radiances,
J. M. Davis, C. Vogel, and S. K. Cox. Feb 80, 51p AS-PAPER-322
Grant NSF-ATM78-12631
Also pub. as ISSN 0067-0340. Sponsored in part by Eppley Lab., Inc.

An instrument designed to measure the angular variation of a radiance field in the .3 to 1.1 micrometers spectral bandpass is described. The instrument consists of thirteen photodiode detectors mounted in fixed positions. Data analysis procedures designed to produce a continuous depiction of the radiance field over a 2 pi steradian solid angle from the thirteen discrete observations are described. These analysis procedures utilize spherical harmonics basis functions as a means of interpolation between the thirteen discrete radiance observations. An analysis procedure used to infer the direct component of the solar irradiance is also given. A modified sensor configuration selected upon the basis of satisfying the analytical procedures, sampling a 2 pi steradian field of view and minimizing sensor overlap, is given.

PNL-3110 PC **A06**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Users Guide to REGIONAL-1: A Regional Assessment Model.
W. E. Davis, W. J. Eadie, and D. C. Powell. Sep 79, 106p
Contract EY-76-C-06-1830

A guide was prepared to allow a user to run the PNL long-range transport model, REGIONAL 1. REGIONAL 1 is a computer model set up to run atmospheric assessments on a regional basis. The model has the capability of being run in three modes for a single time period. The three modes are: (1) no deposition, (2) dry deposition, (3) wet and dry deposition. The guide provides the physical and mathematical basis used in the model for calculating transport, diffusion, and deposition for all three modes. Also the guide includes a program listing with an explanation of the listings and an example in the form of a short-term assessment for 48 hours. The purpose of the example is to allow a person who has past experience with programming and meteorology to operate the assessment model and compare his results with the guide results. This comparison will assure the user that the program is operating in a proper fashion. (ERA citation 05:016472)

TRITA-EPP-79-09 PC **A02**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Institutionen foer Plasmafysik.
Electric Current Model of Magnetosphere.
H. Alfen. May 79, 22p
U.S. Sales Only.

A dualism between the field and the particle approach exists also in plasma physics. A number of phenomena, such as the formation of double layers and the energy transport form one region to another, can be understood only by the particle (electric current) description. Hence a translation of the traditional field description into a particle (electric current) description is essential. Such a translation has earlier been made for the heliosphere. The purpose of this paper is to outline a similar application to the magnetosphere, focusing on the energy transfer from the solar wind. As a first approximation a magnetic field consisting of a dipole field and homogeneous magnetic field is used whereas in a second approximation the configuration is more realistic. (Atomindex citation 10:489393)

UCRL-83269 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Numerical Wind Field Model Validation in Complex Terrain with Application to Pollutant Transport.
W. M. Porch. Mar 80, 7p CONF-800327-3
Contract W-7405-ENG-48
Joint conference on applications of air pollution meteorology, New Orleans, LA, USA, 24 Mar 1980.

The interaction of meteorological data taken at points in a region with numerical models can be done smoothly in gently varying terrain. However, it is fraught with difficulties in complex terrain. Computer memory size limits the resolution of the topography and a point measurement becomes representative of smaller scales as the topography becomes more complex. This paper describes how remotely sensed spatially averaged winds from optical anemometers can be used to help the interaction of wind measurements made at points within a region and numerical regional wind field models. In this paper, emphasis will be placed on model validation both as wind field estimates for applications such as wind energy prospecting, and as input to pollutant dispersion models. (ERA citation 05:017997)

4B. Meteorology

AD-A083 847/4 MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
18201 SIG-D, Missile Number 2466-4, Round Number 2, 5 October 1979.
Meteorological data rept.
Oct 79, 37p Rept no. ERADCOM/ASL-DR-1068
Availability: Microfiche copies only.

Meteorological data gathered for the launching of 18201 SIG-D, Missile Number 2466-4, Round Number 2 are presented in tabular form. (Author)

AD-A083 965/4 PC **A02**/MF **A01**
Ben-Gurion Univ of the Negev Sde Boker (Israel) Inst for Desert Research
Desert Convection Clouds.
Final rept. 1 Nov 76-31 Oct 79,
Louis Berkofsky. 12 Feb 80, 7p AFGL-TR-80-0140
Grant AFOSR-77-3159

Equipment is being set up to measure various properties of desert clouds. The equipment includes a 3 cm. radar, a 0.86 cm vertically pointing radar, a GMD-1 rawinsonde, 12 weighing bucket rain gauges, cameras for stereophotography of clouds. The measurements will include cloud base, cloud height, growth rate of clouds, cloud base radius, rainfall rates, liquid water content, ambient atmosphere temperature, humidity, wind. Along with the observational set-up, a one-dimensional time-dependent plume model has been developed for predicting growth of desert clouds. The program is almost completely checked out. Information from the above-mentioned observational program will be used as input data and as verification data for the model. (Author)

AD-A084 012/4 PC **A03**/MF **A01**
National Aviation Facilities Experimental Center Atlantic City NJ
A Study of the Use of Meteorological Satellite, Weather Radar, and Integrated Graphics Products in the Flight Service Station System.
Final rept. Nov 77-Mar 78,
T. D. Boldt. Apr 80, 28p FAA-NA-79-38, FAA-RD-79/92

A study was conducted on the use of meteorological satellite imagery, weather radar imagery, and computer-generated meteorological graphics in the automated flight service station (FSS). The present meteorological satellite network and image distribution system is explained. The use of image processing of meteorological satellite imagery was investigated. The National Weather Service, Federal Aviation Administration, and United States Air Force's plans for improved weather were investigated. The use of computer-generated and animated graphics for display of meteorological information was investigated. The study concluded that: (1) satellite imagery could be made available in the near term by utilizing components of the present closed circuit television system; (2) the National Weather Service (NWS) network of WSR-57 weather radars provides the best available information for small area detection and depiction of precipitation; and (3) integration of satellite imagery and weather radar imagery will help the specialist in recognizing and interpreting the information available to him. The study recommended: (1) implementation of present video disc and cathode-ray tube technology for electronically storing, displaying, and sequencing satellite images and NWS facsimile weather charts at FSS's; and (2) various studies as to application of available image

processing techniques to meteorological satellite images, application of monochromatic and color displays for satellite imagery, and techniques to automatically derive graphic products from the Federal Aviation Administration Service A circuit. (Author)

AD-A084 034/8 PC **A04**/MF **A01**
Oregon State Univ Corvallis School of Oceanography
Analysis of Meteorological Observations from an Array of Buoys During JASIN.
Master's thesis,
Hiroshi Ishida. Jan 80, 74p Rept no. 80-2
Contracts N00014-76-C-0067, N00014-79-C-0004

Observations of wind speed and direction, air and sea temperature, and solar radiation were obtained from an array of buoys in JASIN. The observations were analyzed to show spatial and temporal variability. Spectra of wind speed and air and sea temperature were computed to illustrate the distribution of variance over periods ranging from 3.5 minutes to 40 days. When plotted on log-log graphs the spectral estimates generally decrease with increasing frequency with slopes between -3/2 and -2. Spectra of air and sea temperature have a peak at the diurnal frequency. When plotted in variance-preserving form, the spectrum of wind speed is consistent with a spectral gap and is qualitatively similar to other observations of low frequency spectra. On the basis of a cross-correlation analysis, it appears that mesoscale eddies propagated with the mean wind speed except during frontal passages. Based on the cross-correlation between wind and air temperature, there is evidence of horizontal roll vortices or organized convection. (Author)

N80-22908/1 PC **A04**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
Earth Radiation Budget Measurements from Satellites and Their Interpretation for Climate Modeling and Studies.
T. H. Vonderhaar, G. L. Stephens, and G. G. Campbell. Apr 80, 58p NASA-CR-159232
Contract NAS1-15553

The annual and seasonal averaged Earth atmosphere radiation budgets derived from the most complete set of satellite observations available are presented. The budgets were derived from a composite of 48 monthly mean radiation budget maps. Annually and seasonally averaged radiation budgets are presented as global averages and zonal averages. The geographic distribution of the various radiation budget quantities is described. The annual cycle of the radiation budget was analyzed and the annual variability of net flux was shown to be largely dominated by the regular semi and annual cycles forced by external Earth-Sun geometry variations. Radiative transfer calculations were compared to the observed budget quantities and surface budgets were additionally computed with particular emphasis on discrepancies that exist between the present computations and previous surface budget estimates.

N80-22925/5 PC **A04**/MF **A01**
Radio Sciences Co., Melbourne, FL.
Solar Terrestrial Relationships Related to Thunderstorms and BUV Dark Current and Ozone Data.
Final Report, Jul. - Dec. 1979.
J. R. Herman. 25 Jan 80, 54p NASA-CR-159957, RSCR-80-1
Contract NAS5-25663

Solar terrestrial interactions as they affect Nimbus 4 BUV dark current and possibly affect thunderstorm occurrence are investigated. A solar wind index is calculated for 1970 to 1971. Dark current enhancements appear to be associated in some way with solar proton events and the solar wind index, but additional investigations by GSFC are required before conclusions can be drawn. Superposed epoch analysis of an index of North American thunderstorm occurrence reveals a discernible increase in the index magnitude on days 1 and 2 following solar proton events. There appears to be little or no 27 day recurrence tendency in thunderstorm occurrence frequency and no association with vorticity area index on a day to day basis.

N80-22932/1 PC **A06**/MF **A01**
World Meteorological Organization, Geneva (Switzerland).
Quantitative Meteorological Data from Satellites.
C. M. Hayden, L. F. Hubert, E. P. Mcclain, and R. S. Seaman. 1979, 114p WMO-531, ISBN-92-63-10531-6
Original Contains Color Illustrations.

The major quantitative information available from meteorological satellite measurements on a regular basis is discussed. Remote soundings of atmospheric temperature and moisture, winds derived from cloud motions observed by geostationary satellites, and Earth surface temperature are included. The application of quantitative satellite data (principally remote temperature soundings) in numerical weather analysis and prediction is also covered. Topics covered include: basic theory behind these quantitative measurements; problems and procedures involved in arriving at useful quantitative results and in applying the data; assessments of the quality of the derived quantities; and illustrations of the various types of data produced.

N80-22934/7 PC **A03**/MF **A01**
Physics Lab. RVO-TNO, The Hague (Netherlands).
Moving Precipitation Clutter Suppression for FUCAS.
H. F. A. Roefs. Jan 79, 27p PHL-1979-02, TDCK-71721

The implementation of a rainclutter suppression system in pulse radar systems such as FUCAS is discussed. Using a simplified rainclutter model, the minimum required clutter suppression as a function of the slant range is determined. It is shown that a set of 5 pulse cancellers provides sufficient clutter suppression for rainfall rates up to 3.5 mm/h.

N80-22936/2 PC **A22**/MF **A01**
World Meteorological Organization, Geneva (Switzerland). Global Atmospheric Research Programme.
Numerical Methods Used in Atmospheric Models, Volume 2.
Sep 79, 508p GARP-PUBL-17-V-2
Prepared in Cooperation with International Council of Scientific Unions, Rome, Italy.

A description of numerical methods applicable to atmospheric models is presented, including vertical coordinates and related discretization, difference approximations for fluid flow on a sphere, the spectral method, the pseudospectral method, the finite element method, difference approximations to quasi-geostrophic models, computational problems related to limited-area modeling, the semi-implicit method, phase speed errors due to various time differencing schemes, and nonlinear stability.

N80-22937/0 PC **A21**/MF **A01**
World Meteorological Organization, Geneva (Switzerland).
Basic Synoptic Networks of Observing Stations.
1979, 500p WMO-217
Text in English and French.

A directory is presented of the regional basic synoptic networks for each of the six WMO regions with a separate section devoted to the basic network for the Antarctic. Each section describes the state of implementation of the basic network and plans for elimination of deficiencies for each country. The stations in each country within a region are identified by an index number, and the surface and upper air observations made by each station given.

N80-22938/8 PC **A08**/MF **A01**
World Meteorological Organization, Geneva (Switzerland).
World Weather Watch: Global Observing System-Satellite sub-System. Information on the Application of Meteorological Satellite Data in Routine Operations and Research: Abstracts, Annual Summaries and Bibliographies.
1979, 158p WMO-475

The titles, abstracts and other relevant information for 59 papers contributed by 14 nations to the World Weather Watch-Global observing system program are presented, in relation to meteorological satellite data applications.

PB80-180797 PC **A07**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
Gate Phase III Mean Synoptic-Scale Radiative Convergence Profiles,
Steven A. Ackerman, and Stephen K. Cox. Apr 80, 135p AS-PAPER-324
Grants NSF-ATM78-05743, NSF-ATM78-12631
Sponsored in part by National Oceanic and Atmospheric Administration, Rockville, MD. Also pub. as ISSN-0067-0340.

Tropospheric radiative convergence profiles are derived for an easterly wave composite during Phase III of the GATE. The easterly waves observed during this period were generally well developed. The profiles also represent the magnitude and the spatial distribution of the Intertropical Convergence Zone (ITCZ) in the GATE area. The 12 hour mean daytime and nighttime profiles are presented. Cloud top pressure distributions, as a function of wave position, are also presented. Day-night differences in the cloud top pressure distributions and radiative convergence profiles are discussed.

PB80-181126 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Hurricane Wind Speeds in the United States.
Building science series (Final),
Martin E. Batts, Martin R. Cordes, Larry R. Russell, James R. Shaver, and Emil Simiu. May 80, 54p NBS-BSS-124
Grant NSF-ENV77-16113
Sponsored in part by Department of Energy, Assistant Secretary for Conservation and Solar Applications. Prepared in cooperation with Russell (Larry) and Associates, Inc., Houston, TX. Library of Congress catalog card no. 80-600039.

A Monte Carlo simulation technique is used to obtain estimates of hurricane wind speeds in the Gulf and East Coasts of the United States. The paper describes the sources of data, the probabilistic models for the climatological characteristics of hurricanes, and the physical models for the hurricane wind speed field used in the estimations.

PB80-182157 PC **A03**/MF **A01**
Delaware Univ., Newark. Water Resources Center.
The Use of the Climatic Water Budget to Evaluate the Validity of a Precipitation Record.
Technical research rept. no. 6,
John R. Mather, and Clinton M. Rowe, Jr. Aug 79, 43p CONTRIB-28, W80-04877, OWRT-A-040-DEL(5)
Contract DI-14-34-0001-9008
Also issued as part of Volume XXXII, No. 1, 1979, Publications in Climatology, C. W. Thornthwaite Associates, Laboratory of Climatology, Elmer, New Jersey.

From 1927 to 1963 the precipitation recorded at La Porte, Indiana, about 30 miles southeast of the Chicago-Gary industrial complex was significantly higher than the precipitation found at any nearby station. Two reasons have been suggested for this anomaly. The first assumes that the record is correct and suggests that industrial pollution has resulted in increased downwind precipitation amounts. The second assumes that the record is incorrect and is merely the result of instrumental or observer error. This report describes the use of the climatic water budget to determine the more likely conclusion. Values of runoff were computed from climatic data from La Porte as well as from South Bend, and Plymouth, Indiana, the stations nearest to La Porte.

PB80-182389 PC **A04**/MF **A01**
Water and Power Resources Service, Denver, CO. Office of Atmospheric Resources Management.
The Sierra Cooperative Pilot Project, 1979 Status Report. Precipitation Management Research in the Sierra Nevada.
Dec 79, 66p
See also report dated Apr 78, PB-282 430.

This document is a report of research, design, environmental, coordination, and public involvement

activities of the Water and Power Resources Service SCPP (Sierra Cooperative Pilot Project). The SCPP is an investigation of the technical feasibility and social acceptability of cloud seeding in the Sierra Nevada to supplement the region's water supply. Results of the 1976-77 and 1977-78 research seasons are reported, and the 1978-79 research program is explained.

PB80-187354 PC **A08**/MF **A01**
National Climatic Center, Asheville, NC.
Selective Guide to Climatic Data Sources,
Keith D. Butson, and Warren L. Hatch. Dec 79, 157p KMRD-4.11, NOAA-80050101
Key to Meteorological Records Documentation.

This guide is designed to assist potential users of climatological data by informing them of the availability of such data in published and unpublished form. It is arranged to indicate the publication(s) in which these data in their various climatological categories (temperature, precipitation, wind, atmospheric pressure, humidity, etc.), both surface and upper air, may be found. A brief review of the pertinent historical facts associated with each publication is given where appropriate. The various climatological tables, charts, and graphs included in each publication are listed, and in many cases abbreviated examples are shown.

PB80-187362 PC **A03**/MF **A01**
National Oceanic and Atmospheric Administration, Washington, DC. Federal Coordinator for Meteorological Services and Supporting Research.
National Severe Local Storms Operations Plan.
Mar 80, 48p FCM-80-1, NOAA-80040403

This is the thirteenth of an annual series of National Severe Local Storms Operations Plans that was developed after a 1967 request by the Federal Coordinator for Meteorological Services and Supporting Research. This plan outlines the responsibilities of the various United States agencies which provide meteorological services in observing and forecasting severe local storms.

PB80-811037 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cloud Seeding. 1976-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1976-May 80,
Robena J. Brown. Jun 80, 142p
Supersedes NTIS/PS-79/0575 and NTIS/PS-78/0523. See also 1964-1975, NTIS/PS-78/0522.

The bibliography is divided into two sections. The first covers generalized studies on cloud seeding techniques and theory, including environmental and water resources planning studies. The second section presents the results of specific cloud seeding experiments. (This updated bibliography contains 132 abstracts, 22 of which are new entries to the previous edition.)

UCRL-15162 PC **A05**/MF **A01**
Arizona Univ., Tucson. Lab. of Tree-Ring Research.
Estimating Long-Term Statistics for Annual Precipitation for Six Regions of the United States from Tree-Ring Data.
H. C. Fritts, E. DeWitt, G. A. Gordon, J. H. Hunt, and G. R. Lofgren. Dec 79, 99p
Contract W-7405-ENG-48

Spatial anomalies of seasonal precipitation for the United States and southwestern Canada have been reconstructed from 1602 through 1961 using dendrochronological and multivariate techniques on 65 arid-site tree-ring chronologies from western North America. Seasonal reconstructions are averaged to obtain mean annual precipitation values for six regions of importance to the Nuclear Regulatory Commission (NRC) Nuclear Waste Management Program (NWMP). Statistics calculated from the regionally averaged annual values for 25-year and longer intervals show annual precipitation in the seventeenth through nineteenth centuries to be lower than in the twentieth century for three regions in the American Southwest and higher for one region in the Northwest and two regions in the East. The variability of precipitation generally was higher in the past three centuries than in the present century. Twenty-five-year intervals with noteworthy statistics are identified and important results are summarized and tabulated for use in the hydrologic modeling of the NWMP. Additional research is recommended to incorporate temperature and precipitation into a single hydrologic parameter. (ERA citation 05:016635)

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A083 713/8 PC **A11**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
An Analysis of the RCA Price-S Cost Estimation Model as it Relates to Current Air Force Computer Software Acquisition and Management.
Master's thesis,
Raymond E. Steffey, Jr. Dec 79, 232p Rept no. AFIT/GSM/SM/79D-20

The enormous technical accomplishments of the computer industry have led to the building of computers of all sizes and complexities. As the range of defense computer applications grows and the complexity of the tasks these systems are called upon to handle increases, the costs of developing the application software has also increased such that it has now become a dominant component in the total system cost. The purpose of this research is to provide those involved in the software cost estimation task with an introduction to Air Force computer resource acquisition and management in general; and specifically to investigate the applicability of the RCA PRICE-S software cost estimation model to Air Force applications system development. A mass of computer software acquisition and management study, policy, and guidance literature was reviewed, and an attempt was made to consolidate the most pertinent information into a description of the overall processes. Historical cost and schedule data were collected on 18 Air Force software development projects. This data which included systems of the three major Air Force applications areas of: embedded avionics; embedded command and control; and management data systems was used to calibrate and validate the PRICE-S cost estimation model. Based on the data available in this preliminary analysis effort, it appears that the PRICE-S model is compatible with current Air Force software acquisition and management techniques.

AD-A083 792/2 PC **A08**/MF **A01**
Army Military Personnel Center Alexandria VA
An Analysis of the Multiple Objective Capital Budgeting Problem via Fuzzy Linear Integer (0-1) Programming.
Final rept.,
Michael George Headly. 31 May 80, 154p
Master's thesis.

A multiple objective fuzzy liner programming approach to the capital budgeting problem is developed. Since much of the available data in any capital budgeting decision situation is either of an imprecise or ill-defined nature, a mathematical optimization technique is required that is capable of incorporating this inherent uncertainty. Fuzzy linear programming provides an effective methodology for this analysis. Specifically, a mathematical model is developed which utilizes fuzzy linear programming as a solution technique for the research and development program or project selection problem. In addition an exchange heuristic, a modified form of C. C. Peterson's exchange algorithm, is presented. A limited bibliography of works in multiple objective optimization is presented. Two computer codes are included. The first utilizes the IBM MPSX/Mixed Integer Programming procedures to solve the (0-1) linear integer programming problem. The second is a FORTRAN program to solve the exchange heuristic algorithm discussed previously. (Author)

AD-A083 797/1 PC **A08**/MF **A01**
Andersen (Arthur) and Co Washington DC
Financial Accounting and Reporting Improvement Concepts.
Final rept. 27 Aug 79-29 Feb 80.
Feb 80, 156p
Contract N00014-79-C-0872

Significant improvements are needed in order for the Navy's financial systems to satisfy internal needs and requirements of the GAO and OSD. Existing and planned financial projects may not provide the needed improvements within an acceptable time period. The most significant of the needed improvements is the reporting of full costs by program and organization and capitalizing and depreciating property. Correcting these deficiencies will be a multi-million dollar effort that will take several years to complete. Before adopting a final plan of action to correct the deficiencies, the Navy should undertake further research to define, in greater detail, cost and property accounting policies that will satisfy its needs and the GAO/OSD requirements in a practical manner. The Navy should also develop a conceptual design of a standard system for implementing those policies in its financial network. A standard financial system developed and maintained through a central systems organization will probably be needed in order to provide reliable financial information on a timely basis and at a reasonable cost.

AD-A083 833/4 PC **A11**/MF **A01**
Naval Postgraduate School Monterey CA
Contrast between Management Information Needs and Information Provided by Industrial Accounting/Control Systems Employed at Selected Coast Guard in House Maintenance Activities.
Master's thesis,
Ronald David Reck. Dec 79, 234p

This thesis examines commercial-industrial environments in the U.S. Coast Guard as portrayed by three individually studied major, and a number of minor depot level maintenance activities. The principal thrust of the study is the identification of information needs of various levels of maintenance activity management with an attempt to determine the degree to which management reports provided as a product of industrial cost accounting/financial control mechanisms match information requirements. To cover an area in which the author finds the existing system of Coast Guard publications lacking, brief overviews of related financing methods and accounting/control system mechanics are also provided. The study concludes with the observation that while the percentage of information needs currently being met by existing accounting and control systems is not high, system improvements such as the collection of additional information, and the presentation of information in slightly different aggregations could result in a much higher percentage of management information needs being fully met. (Author)

AD-A083 838/3 PC **A07**/MF **A01**
Naval Postgraduate School Monterey CA
Government - Prime Contractor - Subcontractor Relationships: An Analysis.
Master's thesis,
Kenneth George Dewell. Dec 79, 141p

This study was undertaken to delineate, analyze, and evaluate the various relationships established between the Government, prime contractors and subcontractors in the acquisition of modern weapon systems within the Department of Defense. Envisioned were the achievement of two primary objectives. First, to identify the relationships as currently established, as well as any significant problems created by these relationships and second, to attempt to ascertain the impact of these relationships, and their inherent problems, on the weapon acquisition process itself. Research methodology consisted of an extensive literature review along with personal interviews of key acquisition officials within both Government and industry. While present relationships were found to be basically effective and efficient, problems and inequities were perceived particularly by subcontractors and should be addressed. While the size and scope of this effort precluded a conclusive finding that present relationships, on the whole, impact negatively on the Federal acquisition process, evidence was found that inequities and problems inherent in present relationships have the potential for hindering the objectives of the weapons acquisition process and that certain remedial actions were both feasible and desirable. (Author)

AD-A083 839/1 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA
The Impact of Regulations on Multi-National Acquisition.
Master's thesis,
Christopher P. Sager. Dec 79, 62p

There are a variety of United States Statutes that impact the contracting officer during the acquisition of requirements from foreign sources. Some of these statutes have provisions for making a determination for their waiver, for others no waiver is possible without Congressional action. The U. S. has entered the world weapons market on an increasing scale in the past few years as a result based, in part, on the new emphasis on NATO cooperation. International considerations are important aspects to be evaluated during the acquisition cycle. Existing international programs have experienced a reluctance by foreign countries and firms to utilize U. S. imposed contracting procedures by the country or firm in their domestic environment, procedures that frequently differ from what is considered normal or standard for the particular country or firm. This thesis addresses the U. S. regulations that have proved to be difficult to impose on foreign governments and contractors and analyzed the alternatives available to the contracting officer; waivers and alternative procedures that provide the same level of confidence as the original statute. The thesis concludes by offering some recommendations to improve the international contracting process. (Author)

AD-A083 977/9 PC **A02**/MF **A01**
Navy Personnel Research and Development Center San Diego CA
Improving the Productivity of Low Performers: An Intervention Case Study on a Navy Ship.
Final rept.,
Kent S. Crawford, Edmund D. Thomas, and Jeffrey J. Fink. Apr 80, 18p Rept no. NPRDC-TR-80-20

A training program was developed to improve the performance of low performers (LPs) aboard a Navy combatant ship. Workshops were conducted for the LPs, all supervisory personnel aboard their ship, and a smaller group of supervisors selected as mentors. The LPs' performance ratings, including supervisory evaluations and disciplinary records, were obtained before and after the training and used to assess improvements. Results indicated that, after training, the LPs received significantly higher supervisory evaluations and committed fewer disciplinary offenses compared to controls. (Author)

AD-A083 983/7 PC **A02**/MF **A01**
Clemson Univ SC Dept of Mathematical Sciences
Statistical Methods in Sole Source Contract Negotiation.
Technical rept.,
K. T. Wallenius. 19 Nov 79, 23p Rept nos. N111, TR-327
Contract N00014-75-C-0451

A scenario is described which involves ill-defined elements of conflict and cooperation: the acquisition of military systems by the Department of Defense (DoD) from large corporations. Current practices lead to situations in which DoD must deal with a sole source and thus forego savings which might be realized from competition between contractors. In order to deal with this situation, the Armed Services Procurement Regulations (ASPR) prescribes procedures which must be employed in the analysis and negotiation of sole source price proposals. These time-consuming procedures generate enormous proposal backlogs for government price analysts who, because of time pressure, may not be able to do a sufficiently thorough and accurate analysis upon which to base their negotiation position. This analysis paralysis also causes payment delays which, in turn, force contractors to borrow working capital and suffer capital costs. It is clearly in the best interests of all parties to expedite the processing of these proposals. This has been accomplished by developing statistical sampling and estimation techniques which, unlike some classical procedures, are not vulnerable to exploitation through the use of clever padding strategies.

AD-A084 010/8 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA
A Financial Approach as an Alternative Organizational Development Intervention.
Master's thesis,
George E. Plank. Dec 79, 73p

Major advances in Behavioral Science studies have led to the recent evolution of Organizational Development (OD) techniques for improving the productivity of organizations. A Major barrier to the practical application of these OD techniques has been the solid resistance of organizations and senior personnel in positions of authority to entry of any outside change agent. This thesis describes two cases that field tested the hypothesis that a financial analysis of an organization can be used as an entry point for an OD program using the techniques of Process Consultation (PC). The case study method provided a practical test of the hypothesis in two contrasting organizations. (Author)

N80-22760/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
The Sophia-Antipolis Conference: General Presentation and Basic Documents.
Mar 80, 50p NASA-TM-76132
Contract NASW-3199
Transl. Into English of Conf. Paper from Cnes, Operation Pilote Interministerielle de Teledetection, Paris (France). Transl. By Kanner (Leo) Associates, Redwood City, Calif. Conf. Held at Paris, Feb. 1980.

The procedures and techniques used in NASA's aerospace technology transfer program are reviewed for consideration in establishing priorities and bases for joint action by technicians and users of remotely sensed data in France. Particular emphasis is given to remote sensing in agriculture, forestry, water resources, environment management, and urban research.

N80-23040/2 PC **A07**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Scientific Services Div.
Cost Estimation and Management Control of Software Development in Scientific/Technical Projects.
U. P. Deboer. 31 May 79, 150p NLR-TR-78056-U
Contract NIVR-1831

Cost estimation of software development and the monitoring and control of factors which affect the development cost is considered. The lack of uniformity in the development approach, the lack of a standard terminology and the limited, difficult to access, cost data bases are included. A cost estimation approach is presented together with a survey of factors affecting the cost of software development, illustrated with figures. To keep these cost factors manageable, a configuration management system is proposed, partly based on procedures and tools already in use for hardware development. Procedures and tools for software configuration management and for related aspects as software testing are described and illustrated with examples from software development projects.

N80-23194/7 PC **A08**
National Aeronautics and Space Administration, Washington, DC.
Management. A Continuing Bibliography with Indexes.
Mar 80, 175p NASA-SP-7500(14)

This bibliography cites 604 reports, articles, and other documents introduced into the NASA scientific and technical information system in 1979 covering the management of research and development, contracts, production, logistics, personnel, safety, reliability and quality control. Program, project, and systems management; management policy, philosophy, tools, and techniques; decision making processes for managers; technology assessment; management of urban problems; and information for managers on Federal resources, expenditures, financing, and budgeting are also covered. Abstracts are provided as well as subject, personal author, and corporate source indexes.

PB80-172752 PC **A14**/MF **A01**
INTASA, Menlo Park, CA.
Carrying Capacity Action Research: A Case Study in Selective Growth Management, Oahu, Hawaii.
Final rept.,
J. Rosing, W. Betchart, and S. Davenport. Jan 78, 306p HUD-0000877, HUD/PDR-368
Contract HUD-H-2554

This research extends preliminary work in applying carrying capacity ideas and criteria to public policy development in Hawaii. Carrying capacity is the amount of service a government can produce without overloading resources. Beginning with the environment, the study identifies growth issues related to resource and environmental systems. These issues are screened and analyzed in sufficient depth to identify major relationships between growth and timing or type of overload (i.e., significant imbalance between demand and supply). Issues are then reformulated to include economic as well as institutional considerations. Using an advisory committee representing public planning agencies as surrogates for public opinion, and based on a set of criteria which reflect methods as well as national and Hawaiian concerns, five issues are selected for deeper analysis: water supply, water quality, economic growth, transportation, and urban land use. For each issue, the approach establishes specific criteria for overload and identifies the most significant assumptions. Analyses of individual issues culminate in recommendations accounting, in part, for interdependence among issues. Interdependence is further investigated and initial recommendations are reassessed, before forming an action plan that recommends moderate growth and emphasizes decreasing demand in several planning areas. The process reported focuses on issues. Quantitative criteria are found to be useful in identifying overload, clarifying growth underlying an overload, and inviting discussion. As a tool for policy formulation and decisionmaking, its use requires a setting where decisions can be made as needed, throughout the process. Technical appendices include the carrying capacity study process and activities, and studies of various carrying capacity issues such as water supply and urban land use. Appendices are referenced, and extensive bibliographies are included for the entire report. (Author abstract modified).

PB80-172760 PC **A02**/MF **A01**
Department of Housing and Urban Development, Washington, DC.
Developmental Needs of Small Cities. A Study Required by Section 113 of the Housing and Community Development Act of 1977.
Executive summary.
Feb 79, 10p HUD-0000879

Section 113 of the Housing and Community Development Act of 1977 directed HUD to study small - city development needs and report on them to the President and Congress. The study encompassed a mail survey directed to chief executives of 1,000 cities, 48 intensive case studies, and 17 group meetings with city officials. Small cities were defined as those with populations under 50,000 which are not central cities of metropolitan areas. As a group, small cities grew between 1970 and 1975. Their community problems related to this development were lack of jobs, lack of adequate housing for low - income and moderate - income persons, and poor street conditions. Small cities of all sizes set their top priorities for funding on infrastructure: water and sewer facilities, streets, solid waste disposal, parks and recreation, and public buildings. Despite many concerns with Federal programs, small cities make extensive use of Federal funding. The larger small cities have been able to take better advantage of Federal programs than have their smaller counterparts, mainly by using staff or consultant resources to investigate what programs are available. The following objectives were developed primarily as a direct result of responses from small cities during the study: (1) reduce the gap between what individual Federal development programs demand of small city applicants and their capacity to meet demands, (2) provide assurance of development grants to more small cities, (3) reduce the burden small cities face in complying with orders for expensive new facilities, (4) reduce duplication of Federal programs and ease the consequences of duplication for small cities, and (5) improve data about small cities.

PB80-172877 PC **A02**/MF **A01**
Urban Inst., Washington, DC.

No Little Plans: Fairfax County's PLUS Program for Managing Growth.
Executive summary.
Dec 76, 17p HUD-0000894, HUD/PDR-220
Grant HUD-VA-PD-2

This executive summary on Fairfax County's PLUS program for managing growth is for citizens, decisionmakers, and all local government staff involved in planning and land - use control. It describes the growth of Fairfax County, Va., a large suburb of Washington, D.C.; the adoption of the PLUS program designed to control growth and achieve a development plan for the county; results of the PLUS program; and some general lessons that were learned. The PLUS program had three major elements: development of updated, comprehensive land - use plans, a capital improvement plan, and planning tools; establishment of a method for regulating the development rate according to public facilities availability; and encouragement of extensive citizen participation. PLUS was successful in only the first and last tasks. Between 1960 and 1970, the county's population, just under 100,000 in 1950, rose 83 percent; school enrollment, 133 percent; and the county budget, more than 300 percent. The county government responded by refining zoning ordinances and allocating sewer capacity to allow for planned unit development, and by replanning county areas. Despite these efforts, 62,000 housing units were added to the existing stock of 69,000 between 1960 and 1970. The $1.5 million PLUS program experience showed that local government has limited control over use of private land, State law and judicial posture should be considered in planning for growth management, and tying growth management to the election cycle promotes closer links between planning and policymaking, and ensures greater attention to citizens' desires. The report details additional results of the program and lessons learned about growth management, development timing, plan making, and citizen participation.

PB80-173065 PC **A06**/MF **A01**
Ernst and Ernst, Providence, RI.
Performance Measurement and Cost Accounting for Smaller Local Governments.
1978, 106p HUD-0000976

This handbook presents to smaller municipalities a system for measuring productivity. The practical approach to productivity measurement is stressed which looks at input in terms of direct cost accumulation, output in terms of workload, and results in terms of effectiveness. The Rhode Island Department of Community Affairs, under a Federal grant from HUD, tested the methods for smaller cities and towns to measure productivity as a method for improving accountability and reviewing productivity of all services. Two major approaches are suggested -- performance reporting and direct costing. The manual assumes these local governments are using manual recordkeeping systems. In implementing the approaches, cities should realize that selecting the measures to be used and accumulating direct costs are the most important steps. To assist smaller governments with this process, a 5 - step framework is given for managers and department heads to select measures and implement reporting. Focusing on objectives, determining the appropriate level of measurement, and examples of some workload measures are emphasized. This is followed by a discussion of direct costing with specific forms and procedures finance directors can use to accumulate these costs. How one community implemented such a system is described in detail. Lastly, concepts and methods of data collection are outlined. Illustrations and charts supplement the text. Two appendices on indirect cost allocation and selected performance measures and a bibliography are included.

PB80-177439 PC **A07**/MF **A01**
Maryland Technical Advisory Service, College Park.
Directory of Sources of Technical Assistance to Municipalities in Maryland.
Annual rept. 1979-80,
Hannah M. Worthington. Apr 80, 149p MTAS/A-80/1457

The report gives a listing of 119 organizations which provide technical assistance to municipalities in Maryland. Each organization is described by an Agency Number, Agency Name, Address, Contact(s), Phone Number, Eligibles, Type, Fee, Affiliation, and Description. The organizations cover the functional areas of Budget Management; Building Codes and Permits; Business; Community and Economic Development; Consumer Social Services; Educational Services; Environmental Management; Fire and Police Services; Legislation; Miscellaneous; Physical Planning; Public Administration; Public Works; Recreation, Parks and Open Space; and Transportation. Four indexes are also included to assist the reader in the use of the Directory.

PB80-177967 Not available NTIS
National Bureau of Standards, Washington, DC.
National Bureau of Standards and the Individual Inventer.
Final rept.,
J. Radinow. 13 Aug 79, 5p
Pub. in Proceedings of the Conference on Innovation, Entrepreneurship and the University, University of California, Santa Cruz, California, November 8-10, 1978, CIED Publ. p83-87, 13 Aug 79.

The talk outlines the program of evaluating inventions submitted to the National Bureau of Standard's Office of Energy-Related Inventions. A brief history of the now defunct National Inventors Council is included.

PB80-178254 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Financial and General Management Studies Div.
Wider Use of Better Computer Software Technology Can Improve Management Control and Reduce Costs.
Report to the Congress.
29 Apr 80, 67p FGMSD-80-38

Because the Federal Government spends billions of dollars annually on computer programs, GAO made this review to determine if the latest tools and techniques were being used to develop and maintain those programs. Computer specialists at many agencies were unaware of the newer, better methods; others were reluctant to change to them. The Government can improve management control and save significant amounts through appropriate use of better software tools and techniques. GAO recommends various ways to promote such use.

PB80-178270 PC **A09**/MF **A01**
Maynard Research Council, Inc., Pittsburgh, PA.
Study of a Mechanism to Foster University/Small Business Interaction. Phase I.
Final technical rept.
18 Feb 80, 177p NSF/RA-800018
Grant NSF-ISP77-14151

The project was undertaken to find effective methods of stimulating technology transfer between academic institutions and small businesses. Special attention was given to methods of reducing existing barriers. The report presents the background and history of the project, its rationale, methods and procedures, changes in approach and personnel, and findings.

PB80-178445 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Procurement and Systems Acquisition Div.
Selected Acquisition Reports (SARs) Defense Department Reports That Should Provide More Information to the Congress.
Report to the Congress.
9 May 80, 31p PSAD-80-37

Important information which would be useful to the Congress and to top-level Defense Department managers is being omitted from DOD's selected acquisition reports. These reports tell where a major weapons program stands in relation to its planned cost, schedule, and performance. Incomplete, misleading, or inaccurate reporting of status could affect congressional and DOD decisions about weapons programs. GAO recommends that DOD improve the information the reports provide and enforce its instructions on preparing the reports.

PB80-179153 PC **A04**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
The Feasibility of an R and D Local Office System in the United States Employment Service. Volume I.
Final rept.,
Susan E. Philipson Bloom, and Lawrence N. Ballis. Mar 80, 62p DLMA-20-25-78-58-1
Contract DL-20-25-78-58
Prepared in cooperation with Community Resources Group, Cambridge, MA. See also Volume 2, PB80-179161.

The study evaluates the feasibility of the 'R&D Local Office System' as a possible way for the Employment and Training Administration (ETA) to strengthen research and demonstrations undertaken within the U.S. Employment Service (ES). The system involves pre-selection of local ES offices, training ES staff in R&D requirements, validation of operating statistics, assembly and reformatting of data about the office, and ongoing monitoring. Volume I describes the purpose and methodological requirements of the Local Office System and how the sample size/selection procedures are determined.

PB80-179161 PC **A04**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
The Feasibility of an R and D Local Office System in the United States Employment Service. Volume II.
Final rept.,
Susan E. Philipson Bloom, and Lawrence N. Ballis. Mar 80, 52p DLMA-20-25-78-58-2
Contract DL-20-25-78-58
Prepared in cooperation with Community Resources Group, Cambridge, MA. See also Volume 1, PB80-179153.

The study evaluates the feasibility of the 'R&D Local Office System' as a possible way for the Employment and Training Administration (ETA) to strengthen research and demonstrations undertaken within the U.S. Employment Service (ES). The system involves pre-selection of local ES offices, training ES staff in R&D requirements, validation of operating statistics, assembly and reformatting of data about the office, and ongoing monitoring. Volume II summarizes four working papers produced as a result of discussions on the feasibility and advantages of various design options for the Local Office System.

PB80-179260 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Prospects for an OSHA/ETIP Project to Facilitate Technological Innovation.
Interim rept.,
Michael A. Mulkey, and Roland G. Weiss. May 80, 52p NBS-TN-1114
Sponsored in part by Urban Inst., Washington, DC.

This document describes the results of research performed to identify and screen candidate interventions for administrative experimentation with the Occupational Safety and Health Administration (OSHA) of the Department of Labor. The broader project, described elsewhere, is analyzing the effects of changes in regulatory processes on industrial innovation. The report presents preliminary conclusions regarding the appropriateness of experimental variances as a possible means of facilitating the introduction of new technology by industry. The first two chapters provide an introduction and a brief history of ETIP/OSHA work. Chapter III describes: the basic logic of expanding the use of OSHA's experimental variance authority to facilitate innovation; types of variances; the variance application and review processes; and limitations on the use of experimental variances to facilitate innovation. Chapter IV describes alternative OSHA policy change processes. The fifth chapter discusses OSHA's role in the equipment market, and Chapter VI describes possible future work.

PB80-180276 PC **A07**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Efforts to Control Fraud, Abuse, and Mismanagement in Domestic Food Assistance Programs: Progress Made-More Needed.
Report to the Congress.
6 May 80, 128p CED-80-33

GAO has made numerous recommendations for dealing with fraud, abuse, and mismanagement in

domestic food assistance programs budgeted by the Department of Agriculture at over $13 billion for fiscal year 1981. Some significant improvements are apparent in the summer food service program, regulation of retailers accepting food stamps, and food stamp accountability. More are needed to correct school lunches not meeting nutritional goals, weak efforts to identify and recover food stamp overissuances, poor implementation of food stamp work registration requirements, and food stamp fraud and abuse in disaster situations. Some long overdue actions have been initiated for these problems, but little has been accomplished so far. Congressional oversight may be needed in two of these areas.

PB80-180292 PC **A06**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Federal Land Acquisitions By Condemnation-Opportunities to Reduce Delays and Costs.
Report to the Congress.
14 May 80, 122p CED-80-54

The Federal Government's many land acquisition programs have brought about a large backlog of court cases in which the Government seeks to acquire by condemnation private land for public use. Such action is generally taken when a landowner is unwilling to sell at the Government's offered price or when the Government cannot acquire clear title without a judicial determination. Land values involved in condemnation cases are in the hundreds of millions of dollars. Court awards or settlements often substantially exceed Government appraisals, and acquisition costs are increased by high administrative costs and long delays in court. This report recognizes efforts of the Department of Justice to reduce the caseload. It also recognizes that the condemnation of real property is a complex process. However, it points out opportunities for Justice and land acquisition agencies to expedite cases and reduce costs. It also points out ways to obtain fair and speedy trials and improve the treatment of landowners.

PB80-180813 PC **A10**/MF **A01**
Center for Governmental Research, Inc., Rochester, NY.
Developing and Applying Analytical Tools to Evaluate the Distributional and Equalization Effects of Federal Grant-in-Aid Formulas and to Improve Formula Performance. Formula Evaluation Project.
Final rept.,
Friedrich J. Grasberger, Jeffrey O. Smith, Alan J. Taddiken, Pluma W. Kluess, and Christine Ryan. Jan 80, 204p NSF/RA-800009
Grant NSF-APR77-15726

The report describes a project designed to develop information and analytical techniques to improve evaluative data on the performance of existing and alternative formula-distributed Federal grants-in-aid to state and local governments. The study includes a description, classification, and review of grant-in-aid formulas; formula issues and alternatives; a formula evaluation framework with respect to distributional impact; equalization analysis and the GAP analytical model; and formula evaluation results. Various aid programs are studied and working papers prepared for each.

PB80-180995 PC **A05**/MF **A01**
Ohio State Univ., Columbus. Computer and Information Science Research Center.
Information Flow and Analysis: Theory, Simulation, and Experiments. Part I. Basic Theoretical and Conceptual Development. Part II. Simulation, Examples, and Results. Part III. Preliminary Experiments and Analysis.
Final rept.,
M. C. Yovits, C. R. Foulk, and L. L. Rose. Dec 79, 84p OSU-CISRC-TR-80-4
Grants NSF-GN-41628, NSF-IST76-21949
Sponsored in part by Grant NSF-IST79-08327.

The paper describes research which has been underway to develop a fundamental and general theory of information flow and analysis. More specifically, the research attempts to: (1) identify and quantify important variables and parameters in the information flow process; (2) establish relationships among these variables; (3) apply the theory to practical situations and to examine the resulting implications; and (4) develop models, both simulation and experimental, to utilize and validate the theory. The basis for the work treats information as data of value in decision making.

PB80-181837 PC **A09**/MF **A01**
Environmental Science and Engineering, Inc., Gainesville, FL.
Quality Assurance Guidelines for IERL-Ci Project Officers.
Final rept. Sep 78-Dec 79,
Charles L. Stratton, and John D. Bonds. Dec 79, 198p EPA-600/9-79-046
Contract EPA-68-03-2656

The document provides guidelines to Industrial Environmental Research Laboratory-Cincinnati (IERL-Ci) Project Officers for (1) incorporating quality assurance (QA) criteria in contract procurement and grant awards; (2) monitoring quality assurance of extramural projects; and (3) conducting QA audits for projects involving sampling and analysis activities. The Project Officer's responsibilities are described for the initiation, monitoring, and satisfactory conclusion of contracts, research and demonstration grants, and cooperative agreements of the type normally funded by IERL-Ci. Guidance is provided to assure QA is adequately addressed during project conception and solicitation and that prospective grantees are informed of QA requirements. A technical evaluation system is presented for the evaluation of the QA aspects of proposals and grant applications. The basic elements of an acceptable QA program and of a project QA plan are described, and the Project Officer's role in QA monitoring is discussed. A procedure is described for conducting QA audits of active projects. Checklists are included to assist the Project Officer.

PB80-182454 PC **A16**/MF **A01**
Battelle Columbus Labs., OH.
The Problem Analysis Phase: Task 8 -- Assessing the Adequacy of R and D.
Final rept.,
William L. Swager. 23 Feb 79, 363p NSF/PRA-7824022/1
Grant NSF-PRA78-24022

The report has as its objective the identification of opportunities for non-fuel minerals/materials research within the private and public sectors. The methodology consisted of data collection, development of a rank ordering of the opportunities for R&D by sector and mineral, and a comparison of the opportunities so identified with the content and funding of current governmental and industrial R&D. The conclusions drawn from the study are that there are many opportunities for R&D which hold promise for alleviating mineral supply problems in the short, intermediate, and long run.

PB80-182546 PC **A11**/MF **A01**
Stanford Univ., CA. Inst. for Communication Research.
Modeling Technological Innovation in Private Firms: The Solar and Microprocessor Industries in Northern California,
Everett M. Rogers, Victor C. Walling, Dorothy Leonard-Barton, and David W. Gibson. Mar 80, 230p
Grant NSF-PRA78-24052

The purpose of the report is to present the results from a research project on modeling technological innovation in the solar flat-plate collector industry and the microprocessor industry in Northern California during 1979. The objectives of this research were: To generate a framework for the study of technological innovation in private organizations; to test and demonstrate the feasibility of using this framework to determine how innovation occurs in firms within two industries; and to provide a foundation for a long-range institutional program in technological innovation and public policy. Each of the two industries of study is organized around a basic innovation: (1) the solar industry rests on the solar flat-plate collector dates from the turn of the century and (2) the microprocessor industry rests on the idea of putting a computer on a small silicon chip.

PB80-184039 PC **A03**/MF **A01**
Council on Environmental Quality, Washington, DC.
Council on Environmental Quality Interagency Task Force Report on Environmental Data and Monitoring.
Final rept.
21 Mar 80, 44p

The President's 1977 Environmental Message called attention to deficiencies in the nation's environmental data and monitoring programs. These deficiencies included inadequate monitoring design, poor quality assurance and coordination, and insufficient data and analytical information for environmental assessment, policy development, and program evaluation. The report reviews environmental data and monitoring programs and makes recommendations that would improve the effectiveness of the programs.

PB80-184617 PC **A05**/MF **A01**
Municipal Finance Officers Association of United States and Canada, Washington, DC.
Essays in Public Finance and Financial Management: State and Local Perspectives,
John E. Petersen, and Catherine Lavigne Spain. c1979, 90p ISBN-0-934540-03-9, NSF/RA-800016
Grant NSF-APR77-20340
Library of Congress catalog card no. 79-24847.

This collection of essays provides an overview of research activities in the major financial and problem areas of state and local government finance. The essays not only provide a reference point for current research but also represent a valuable contribution to defining the state of the art over a vast array of disciplines and problems. (Copyright (c) 1978 and 1980 by the Municipal Finance Officers Association of the United States and Canada.)

PB80-186125 PC **A04**/MF **A01**
Council of State Planning Agencies, Washington, DC.
Democratizing the Development Process.
Rept. no. 6 (Final),
Neal R. Peirce, Jerry Hagstrom, and Carol Steinbach. c1979, 56p ISBN-0-93482-05-1, EDA-ERD-80-149
Grants EDA-99-7-13360-1, EDA-OER-553-G-78-21
Library of Congress catalog card no. 79-63784.

This review of citizen impact on development around the Nation indicates that there are clear alternatives to the past negative standoff scenario. At the forefront of the growing citizen participation movement are three new departures, grounded in conciliation rather than confrontation, and generally supportive of new development. They are: negotiated development of large enterprises; a new form of community economic development decision-making particularly appropriate to rural boom towns; and public-private enterprises to promote a greater level of community self-reliance.

PB80-189129 PC **A03**/MF **A01**
Northeast-Midwest Inst., Washington, DC.
Guide to Federal Procurement: Doing Business with the U.S. Government.
Final rept.,
Laurence Zabar. Sep 79, 48p EDA-ERD-80-151
Grants EDA-OER-642-G-78-31, EDA-99-7-13455

The publication is a guide on federal spending practices which explains how the federal government does business and how firms can receive preference when bidding on federal contracts. Included in this booklet are sections on how the departments and agencies of the federal government purchase their goods and services and detailed summaries and analyses of the Small Business Set-Aside Program and Defense Manpower Policy Number Four (targeted procurement guidelines for stimulating economic development). Also included is a 10-step program for setting up a Procurement Outreach Program modeled after a pilot program administered in Massachusetts. The program is designed to help bring buyer and seller--the U.S. government and local suppliers--together.

PB80-811193 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
PERT. 1964-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-May 80,

Jack Jones. Jun 80, 253p
Supersedes NTIS/PS-79/0588 and NTIS/PS-78/0549.

The citations present the use of PERT in various management areas, including military management, construction management, financial management, and many other areas. Other management techniques, such as the critical path method are included in conjunction with PERT. (This updated bibliography contains 246 abstracts, 15 of which are new entries to the previous edition.)

5B. Documentation and Information Technology

AD-A083 666/8 PC **A07**/MF **A01**
Army Training and Doctrine Command Fort Monroe VA
TRADOC Library and Information Network (TRALINET).
Annual rept. no. 1, 1 Oct 78-30 Sep 79,
JoAn I. Stolley. Mar 79, 145p

This is the first annual report of the TRADOC Library and Information Network (TRALINET). The report discusses background of the TRADOC Library Program; factors leading to the TRALINET concept; TRALINET resources, development, and implementation; network membership: and network administrative and operational activities. The formal network structure has only existed since 3rd quarter FY 79 and is designed to serve 44 TRADOC Morale Support, School and Academic, and Technical library systems. It is viewed as a prototype for the larger Army library system.

AD-A083 800/3 PC **A24**/MF **A01**
Defense Technical Information Center Alexandria VA
Data Element Dictionary; DTIC Uniform Data System,
Allan Kuhn, and Melissa L. Young. Apr 80, 551p
Rept no. DTICH-4185.8
Supersedes Second Edition dated Jul 79.

The Data Element Dictionary standardizes the data elements and identifies the data uses that will constitute DTIC's uniform system. These standardized data elements will enable DTIC to incorporate its data banks, currently operating independently, into a uniform system. They will provide the capability of standardized access to all component data bases, or any combination of them. The dictionary, in becoming the authority for data standardization, will serve as a communication link between system designers, programers and subject specialists, and will provide a foundation for effective management of the data constituting the DoD Scientific and Technical Information System. Also included are detailed descriptions of the current data banks and their relationships to the planned uniform system. (Author)

AD-A083 832/6 PC **A05**/MF **A01**
Naval Postgraduate School Monterey CA
NALCOMIS and the Aviation Maintenance Analyst.
Master's thesis,
Glenn J. Boston. Dec 79, 96p

NALCOMIS has been conceived as a modern management information system which will provide for effective and efficient execution of the Naval Aviation Maintenance Program (NAMP) by providing aviation maintenance and material managers with timely, accurate and complete maintenance and material information. Although NALCOMIS basically provides for improved mechanization (computerization) of the existing Naval Aviation Maintenance Program, some functional responsibilities may change when NALCOMIS is implemented. The analysis function is one of those areas where change of responsibility can be expected. Analysis now perform certain functions generally in accordance with OPNAVINST 4790.2B requirements. When NALCOMIS is implemented, some of their specific responsibilities will be deleted and other responsibilities would or should be added. Exactly what the new role of the Analyst would be under NALCOMIS is a question which should be considered carefully and in-depth. Identification and implementation of required changes in the Analyst's functional responsibilities should commence now in order to meet the demands on the MIS when NALCOMIS is implemented. (Author)

AD-A083 948/0 PC **A03**/MF **A01**
Computer Corp of America Cambridge MA
Spatial Data Management System.
Quarterly research and development technical rept. 1 Jun-31 Aug 79,
Mark Friedell, David Kramlich, Christopher F. Herot, and Richard Carling. 31 Aug 79, 44p
Contract MDA903-78-C-0122, ARPA Order-3487
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

This technical report describes work completed on a prototype Spatial Data Management System (SDMS). The Graphical Display of Data presents an overview of the icon creation mechanisms currently included in SDMS. Icon creation is the facility by which graphical representations of symbolic data are automatically produced. These graphical representations are referred to as 'icons'. Section two includes detailed discussions of the icon creation features added to the system: Secondary data a mechanism by which information in multiple relations or tuples may be presented in a single icon, and a subicons mechanism that allows the appearance of a portion of an icon to be described independently of its parent icon.

AD-A084 063/7 PC **A04**/MF **A01**
Office of Naval Research London (England)
European Scientific Notes. Volume 34, Number 3,
Willard D. Bascom, and Don J. Peters. 31 Mar 80, 62p Rept no. ESN-34-3

This is a monthly publication presenting brief articles concerning recent developments in European Scientific Research. It is hoped that these articles (which do not constitute part of the scientific literature) may prove of value to American scientists by calling attention to current developments and to institutions and individuals engaged in these scientific efforts. The articles are written primarily by members of the staff of ONRL and occasionally articles are prepared by, or in cooperation with members of the scientific staffs of the United States Air Force's European Office of Aerospace Research and Development and the United States Army Research and Standardization Group. Articles are also contributed by visiting Stateside scientists. (Author)

AD-A084 074/4 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Computers and the Control of the Transportation Process,
P. F. Krivonos. 9 Apr 80, 19p Rept no. FTD-ID(RS)T-0310-80
Edited trans. of Zheleznodorozhnyy Transport (USSR) n5 p10-16 1972, by Bernard T. Tauber. Diagrams in Russian.

No abstract available.

ED-174 265 Not available NTIS
Committee for the Coordination of National Bibliographic Control, Washington, DC.
The Subject Access Problem--Opportunities for Solution: A Workshop.
Oct 78, 81p
Sponsored in part by Council on Library Resources, Inc., Washington, DC., National Commission on Libraries and Information Science, Washington, DC., National Endowment for the Humanities, Washington, DC., National Science Foundation, Washington, DC. Workshop given by the Committee for the Coordination of National Bibliographic Control Springfield, Virginia, October 18-20, 1978.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This report presents the recommendations of 35 workshops participants, drawn from a variety of backgrounds and information environments, which was organized to: (1) highlight the role of subject access with the emphasis on the needs of the information seeker; (2) compare techniques for subject access now being used in the library and the abstracting and indexing (A&I) communities, including applicable research efforts; (3) emphasize the role and nature of authority files in subject access control and facilitation; and (4) seek opportunities to improve information preparation for subject access through better functional interconnection and integration across all communities, and to promote the use and enhance techniques for subject access to classes of publicatons not now adequately covered. The report includes an executive summary, background information on the subject approach to accessing information, a description of the workshop design, 20 definitions of 'subject access,' a summary of workshop proceedings, draft recommendations from the discussion groups, and a final synthesis with action recommendations.

ED-175 389 Not available NTIS
County-Wide Cooperative Library Services, Clackamas County, Oregon. A Long Range Plan,
Phyllis I. Dalton. 1977, 114p
For related document, see IR-007 132.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Aspects of cooperative services considered in this final report include the concept of total library service, the concept of universal access, organization, planning, basic library services, staffing, community resources, library facilities, funding, staff training, and public information. Special services to meet special needs (such as library service to business, government, the handicapped, and institutions) and future developments in county-wide cooperative services are discussed, and a suggested time table for development is presented. Salient maps, tables, and charts, as well as other county-related information, are provided in appendices, which comprise half of the document.

ED-175 390 Not available NTIS
Countywide Cooperative Library Service, Lincoln County, Oregon. An Action Plan,
Phyllis I. Dalton. 1978, 90p
For related document, see IR-007 131.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This compehensive action plan addresses eight areas important to the development of countywide cooperative library service: the utilization of total library resources and services, accessibility of library service, organization, financing, special services for special needs, short range action plans, and long-range planning. Additional sections of the report cover population characteristics of Lincoln County, geographic characteristics, library characteristics, collection evaluation, special collections, audiovisual collections, and bibliographic control. Appendices, which comprise almost half of the report, provide other county-related information, as well as sample contract forms, tables, and references.

ED-175 394 Not available NTIS
Illinois Univ. at Chicago Circle.
Local Documents Project. Final Report to the Illinois State Library, November 15, 1976 to May 15, 1978,
Yuri Nakata. 15 May 78, 32p
Prepared in cooperation with Illinois State Library, Springfield.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The project described in this report was designed to create an awareness of local documents on the part of libraries in the Chicago metropolitan area and to gather data on the scope of local document collections in area libraries. Through workshops and personal visits to libraries, the project reached 275 librarians, and, as a result of needs expressed at the workshops, two publications emerged: a manual on the collection and organization of local documents, and a directory of local libraries featuring the scope of local document collections. This overview of the project includes sections on methodology and evaluation, and four recommendations, as well as a list of the project staff and advisory committee members. Appendices contain the evaluation questionnaire and the financial report.

ED-175 402 Not available NTIS
Institutional Library Consultants, Carson City, NV.
The Role of the Institutional Library Consultant. Proceedings and Sampler of Materials from a Workshop Held in Reno, Nevada, October 9-11, 1979.
Oct 79, 73p
Prepared in cooperation with Western Council of State Libraries, Inc., Carson City, NV.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The role of the institutional library consultant is explored in these proceedings of a workshop examining consultant work with administrators of various agencies, funding sources for institutional library service programs, management, and such aspects of library service areas in institutions as architecture, design, utilization of space, bibliotherapy, censorship, and legal and medical information. Patterns of organization, staffing, personnel, standards, training, evaluation of services, budget planning and preparation, and effective communications between consultant and institutions are the managements issues considered. The proceedings consist of in depth reports on the panel presentations, and briefer reports on the work of groups based on the reports of recorders of group sessions and the editing of verbatim tapescripts of the formal presentations. Participant comments evaluating the workshop are included, along with a directory of institutional library consultants. Samples of preworkshop preparation materials and materials disseminated at the workshops are also provided.

ED-175 403 Not available NTIS
The Selective Disseminator of Information (SDI): A New Role for the Librarian,
T. H. Strehlow. 1978, 26p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This article describes the duties of a research librarian appointed to provide a comprehensive information service to the administration of an academic institution. Information, in the sense used here, refers to published information about other institutions and the outside world, not internal data on finance, staff, and students. The resultant service was a selective dissemination of information (SDI) of a corporate nature, that is, a single information service tailor-made to the needs of a small, relatively homogeneous group. It included those subjects which clients had requested and those items which could be important to the development to the development of the institution, whether clients had requested them or not. An unexpected by-product of the corporate SDI was that it was used not only by senior management for current awareness but also retrospectively by the whole institution. As a result, as much as one-third of the time spent on the corporate SDI came to be devoted to bibliographic control.

ED-175 404 Not available NTIS
National Library of Canada, Ottawa (Ontario).
Sources of French-Canadian Materials for Children,
Irene E. Aubrey. 1979, 9p
Text in English and French.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This bibliography of reference sources for French-Canadian children's books includes bibliographies, indexes, a publishers' trade annual, recommended lists, and features in professional journals. The citations are presented alphabetically by title--in English, in French and English, or in French, depending on their source--and an address where it may be obtained is provided for each; cost is indicated for serials.

ED-175 442 Not available NTIS
School Media Programs and Networking: A Position Paper,
Mary Frances K. Johnson, and Theodore C. Hines. Jun 77, 34p
For a related document, see ED-168 599.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This paper prepared for the Task Force on the Role of School Library Media Programs in Networking reviews the role of networking in such programs, lists the objectives of networking for library consortia, and discusses such topics as the benefits and disadvantages of participation in these organizations, prerequisites and criteria for networking, and barriers to cooperation. An analysis of clienteles to be served is also provided, as well as lists of networking relationships and types of networking activities, and a model of the parameters of library consortia. School library participation in networking activities is described for the states of California, Illinois, Maryland, Massachusetts, New Jersey, New York, North Carolina, Oregon, Pennsylvania, Utah, Washington, and Wisconsin, and the Calgary (Alberta) Public Library. Recommendations directed to the task force and a 34-item bibliography conclude the report.

ED-175 457 Not available NTIS
New Jersey State Library, Trenton. Library Development Bureau.
New Jersey Blueprint for School Media Programs. Second Edition.
1979, 21p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Designed to be used for self evaluation at the local level, as a guide for supervisors, and to provide direction for short and long range planning of library media programs, this document proposes some guiding principles, defines selected terms, and outlines quantitative standards. The checklist of standards which makes up the greater part of the pamphlet is intended for use by individual libraries to examine their operations in terms of staff, facilities, collection, and equipment.

ED-175 465 Not available NTIS
United Nations Educational, Scientific, and Cultural Organization, Paris (France).
An Annotated Bibliography of UNESCO Publications and Documents Dealing with Space Communication, 1953-1977.
Oct 77, 102p CC-77/WS/38
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This bibliography provides a consolidated list of papers, reports, articles, and publications produced by Unesco in the field of space communications: it incorporates two previous bibliographies compiled in 1970 and 1973. Listed in alphabetical order by authors' names or titles, citations include extracts from periodicals and publications, isolated Unesco General Conference documents, Executive Board documents and publications, and reports prepared by Unesco experts, which are listed according to country or continent visited. Papers prepared by Unesco for participation in meetings, colloquiums, conferences, and working groups organized by other organizations are classified according to the title of the meeting. Documents prepared for meetings organized by Unesco, also classified according to title of the meeting, include working papers contributed to the meeting by outside bodies; the final report of the meeting is the first document abstracted. Languages in which each item was published are indicated, and a title index with cross references is included.

ED-175 468 Not available NTIS
Association of Coll. and Research Libraries, Chicago, IL.
Bibliographic Instruction within Library and Discipline Associations: A Survey of Contact Persons and Committees,
Anne K. Beaubien. 1979, 31p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

The Committee on Cooperation of the Association of College and Research Libraries, Bibliographic Instruction (ACRL, BIS) devised questionnaires which were sent to library and professional associations in various academic disciplines to identify existing groups concerned with bibliographic instruction. The first questionnaire sent to current chairpersons of all ACRL sections, chapters, and discussion groups, and to other American Library Association (ALA) divisions and selected round tables, indicated that 13 ALA-related units have a committee for instruction. Only two units mentioned a discipline association with an instruction committee. Library associations outside the ALA responded, through the second questionnaire, that three associations have instruction committees or disciplines met at least one of the criteria listed in questionnaire three to determine concerns for library instruction and information. Based on these findings, the Subcommittee on Professional Organizations should concentrate on communication and cooperation within ACRL and ALA, initiating contact with discipline associations and establishing a joint committee with SLA. Detailed survey results include addresses and contact persons for programs identified; the three questionnaires are included.

ED-175 470 Not available NTIS
Kent State Univ., OH.
Celebrating the International Year of the Child: Related Bibliography,
Clara O. Jackson. Apr 79, 13p
Prepared for the 21st School Media Workshop, Kent, OH. April 27-28, 1979.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Prepared for a school media workshop held at Kent State University in April 1979, this annotated bibliography on topics related to the International Year of the Child includes publications about children, children's rights, some child advocacy organizations, some sources of information about the United Nations' International Year of the Child, special publications for the year, quality media programs, comics, a sampling of literature and related crafts for children set in many parts of the world, roots, and books and articles dealing with television and allied media. Also provided are sources for other information and a list of additional organizations for radio and television.

ED-175 471 Not available NTIS
A Community Analysis in Respect to Library Services, Washington County, Virginia,
Martha A. Carter. Jan 79, 74p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This analysis of the community was designed to identify the needs of its citizens so that the Washington County Public Library could plan more responsive library services. Sections described the physical and historical aspects of the community; demographic characteristics of its population, including age, sex, education, employment status and occupations, and income; clubs and organizations; and the library, its development, facilities, staff, financial resources, materials collection, users, and services. Conclusions and recommendations are presented, based on the factual material described and the minimum standards for public libraries adopted by the Virginia State Library Board in January 1978. Nineteen data tables present the statistics used in the analysis; appendices list the organizations and agencies of the county (with the name, address, and telephone number of each president), and show statistics for the materials collection (as of July 1, 1978) and for library circulation, by the main library and the mobile library, from 1974-78. A bibliography of the sources used is also included.

ED-175 472 Not available NTIS
Virginia Commonwealth Univ., Richmond.
Computer Output Microform (COM) Catalog Requirements for the Virginia Commonwealth University Libraries,
Robert L. White. Mar 79, 78p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Generated as the result of the deliberations of the COM Catalog Advisory Work Group, which depended heavily on a review of the available literature, individual analysis, and group discussion, this report is intended as a general planning document for Virginia Commonwealth university libraries concerning their possible implementation of a COM (computer output microform) catalog. Attention is

given to the advantages and disadvantages of a COM catalog, building a library data base, strategies for conversion, closing the card catalog, COM catalog format and frequency of update, film type and format, and problem areas. Special importance is placed on listing the following types of requirements for a COM catalog: general, bibliographic records, film format, and microform readers. In addition, recommendations for dealing with potential problem areas are presented, as well as a general implementation schedule. Included are appendices on retrospective conversion (SOLINET), bibliographic record formats, library location designations, estimated card catalog maintenance costs, a framework for cost-benefit analysis, design for a catalog use study, statistical projections, film format (roll film vs. fiche), and measures of COM catalog effectiveness. A selective bibliography on COM catalogs is also provided.

ED-175 473 Not available NTIS
Salisbury State Coll., MD.
The Curriculum Laboratory in an Academic Library: A Simulated School Library,
Beth Knapke. 1979, 16p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This description of the simulated school library of the Salisbury College curriculum laboratory explains its operation and development in a small college setting. Sections provide an overview of the laboratory's collections, physical arrangement, and use. Included are handouts given to students which describe the facility's philosophy and services.

ED-175 474 Not available NTIS
Stanford Univ., CA. BALLOTS Center.
Demonstration of Multilibrary Services through BALLOTS Network: Final Report of the BALLOTS Center to the California State Library on Contract Activities from October 1, 1974 to June 30, 1978.
Aug 78, 21p
Prepared in cooperation with California State Library, Sacramento. For related documents, see IR-007 640 and ED-156 106.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210. Also available from The Research Libraries Group, Inc., Stanford, CA. 94305 ($1.00, prepaid).

This narrative report relates the activities of the Bibliographic Automation of Large Library Operations using a Time-sharing System (BALLOTS) program at Stanford University for the original contract period and extensions, during which time the original single-user system was transformed into an automated network of libraries across the country. These libraries share their online processing and cataloging activities, accessing the system in either of two communications modes. The impact of the California State Library contract on BALLOTS is discussed, and reactions to BALLOTS from some public libraries are included.

ED-175 478 Not available NTIS
An Evaluation of Services of the County Schools Professional Teachers' Library,
Michael Arsulich. May 79, 65p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

A survey of users of the teachers' library at the San Diego County Department of Education was conducted to assess the level of effectiveness of the library's collection and services in four general areas: (1) professional literature and curriculum collection, (2) publications from the professional resource and development service, (3) textbook display centers, and (4) online search services. Summaries of the responses to the 120 questionnaires which were returned are provided for each of the questions. Appendices include a copy of the questionnaire and samples of several library publications: Curriculum Currents (an annotated bibliography); Noteworthy Practices (a newsletter); and selected bibliographies on competency based education in California, economic education, hemispheric dominance, education vouchers, teaching spelling, team teaching, and year round schools.

ED-175 481 Not available NTIS
Minnesota State Dept. of Education, St. Paul. Library Div.
Humanities in Minnesota: People, Funding, Ideas. A Handbook of Resources,
Suzanne LeBarron. Mar 79, 59p
Sponsored in part by National Endowment for the Humanities, Washington, DC.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This handbook, produced by a project of the Office of Public Libraries and Interlibrary Cooperation (OPLIC), provides planning, topic, funding, and resource information to help public libraries in Minnesota, in collaboration with other education and community agencies, provide public adult programming in the humanities. Information was gathered through statewide planning meetings involving public librarians, as well as people from educational agencies, community organizations, other types of libraries, and interested citizens. Telephone surveys were conducted to assess current public library programming for adults, particularly in the humanities, and to initiate a survey to judge circulation of adult humanities materials. Included is a directory of humanities resource people in Minnesota representing teachers, writers, and practitioners willing to assist in planning, participate in programming, or assist in grantwriting; area library and topic indexes to the directory are provided.

ED-175 483 Not available NTIS
Wisconsin State Dept. of Public Instruction, Madison. Div. of Library Services.
Suggestions for Dealing with Censorship of Media Center Materials in Schools: A Wisconsin Plan.
1978, 19p WSDPI-9233
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Procedures for developing selection standards for media center materials and for handling complaints that may arise are identified. To aid the librarian or school media specialist who needs assistance in censorship matters, a list of appropriate Wisconsin area agencies and associations is given, including their purposes, services, addresses, and phone numbers. It is recommended that each Wisconsin school district design an official board approved policy for the censorship of instructional materials which reflects the particular philosophy of the district; such a policy would contain a statement of objectives and responsibilities, a statement of challenged materials. Guidelines for maintaining a public information program within the school, parent group, and community at large are offered as a means of reducing the necessity of defending selected materials. Should such defenses become necessary, recommendations for dealing with parental concerns about challenged selections are presented. Further suggestions can be obtained from the 14 library organizations, teacher federations, and civil liberties agencies listed.

ED-175 485 Not available NTIS
National Library of Canada, Ottawa (Ontario).
Theses in Canada: A Guide to Sources of Information about Theses Completed or in Preparation,
Susan Jaques Bruchet, and Gwynneth Evans.
1978, 32p
Text in English and French.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This bibliography provides a list of sources for students, scholars, and librarians who want information about theses completed or in preparation at Canadian universities. The sources are presented under three headings: general bibliographies, theses lists by university, and specialized bibliographies. For monographic items, the author, title, and publishing information are recorded; for serial literature, the listing provides the title of the article, the periodical title, and the volume, number, and date. Specific disciplines covered are area studies, Canadian ethnic studies, communications, economics, education, forestry, geography, geology, history, language and literature, law, nursing, philosophy and religion, political science, public administration, psychology, sciences, and sociology and social work.

ED-175 486 Not available NTIS
McGill Univ., Montreal (Quebec). McLennan Library.
Training Program for Reference Desk Staff,
Lillian M. Rider. 1979, 17p

This manual outlines the program used by McGill University's McLennan Library to train new staff members in reference desk services. Relying heavily on the principles of learning by example, the training program embodies on-the-spot demonstration techniques which are included in two phases: initial training and further training. One week in duration, the first phase is highly structured to permit a basic introduction to policies, procedures, locations, and people. Upon its completion, the trainee works daily shifts at the desk and telephone, and begins further training which lasts two to three months. Throughout the program, time to browse and digest is scheduled to reinforce the verbal explanations of departmental functions, as well as to emphasize the best use of classic reference tools and services in the system. Most training sessions are conducted by the senior reference librarian and last one hour each. Both phases of the program are detailed step by step in the manual, which also provides sample schedules and a summary checklist of training activities.

HRP-0902065/2 PC **A10**/MF **A01**
California Univ., San Diego. Dept. of Medicine.
Developing Regional Poison Systems,
Sylvia Micik. Jul 79, 204p
Contract PHS-HRA-232-78-0173

The national Emergency Medical Services program has identified poisoning as a significant national emergency medical problem, for which a patient care system must be developed. Since the development of the first poison control center in Illinois in 1953, efforts to solve the poison problem have been made, yet they have been generally unsuccessful in altering the rising incidence of morbidity and mortality due to poisoning. These efforts included the development of over six hundred isolated poison information centers, most of which cannot sufficiently meet the needs of the patient or the professional treating him. They have developed haphazardly, without regional planning and without focusing on patient care needs and system development. Model programs in Salt Lake City, Denver, Pittsburgh, Boston, San Diego and other cities are implementing regional poison patient care systems in conjunction with their Emergency Medical Services Systems lead agency. These programs have demonstrated the basic system design and organizational structure that are needed to develop and organize regional programs that reduce the mortality and morbidity of poisoned patients. This training manual is the product of a training program developed in response to the urgent need to train physicians who are serving as medical directors of regional poison programs in the current national strategy and state of the art of regional planning and poison system design, implementation and evaluation. The manual summarizes the current knowledge, issues, problems and approaches to solutions for those problems in poison control systems.

HRP-0902079/3 PC **A08**/MF **A01**
Association of Schools of Public Health, Arlington, VA.
Activities of U. S. Schools of Public Health, 1974-1979.
Final rept.,
William B. Parsons. 1979, 157p
Contract PHS-HRA-231-77-0007

The purpose of the project was to implement a data collection system which would obtain data on the production of public health manpower which could be evaluated, analyzed, and disseminated as uniform, reliable information. The demands of legislation had placed pressure on the schools to provide the Executive Branch of the Federal Government and the Congress with data on their applicants, students, faculty, and graduates. Also, information was being requested on expenditures, research activities, and cost of education. These demands created the atmosphere in which the data project was initiated.

HRP-0902146/0 PC A08/MF A01
Nutrition Foundation, Inc., Washington, DC.
Education in Nutrition for Physicians and Dentists. An Annotated Bibliography,
Richard M. Stalvey. 31 Aug 76, 167p
Contract PHS-PLD-0698-76
Sponsored in part by Bureau of Health Professions, Hyattsville, MD. Div. of Medicine.

The report consists of an annotated bibliography of papers and articles on the subject of nutrition and its teaching in medical schools. Also included are papers from two symposia on nutrition education, and congressional hearings.

N80-23208/5 PC A02/MF A01
European Space Agency, Frascati (Italy).
The Information Retrieval Service of the European Space Agency.
Dec 79, 12p

The on-line retrieval system and specialized offline services for the bibliographic data bases and factual data banks are described. Subscription information for European users is given.

N80-23209/3 PC A03/MF A01
Instituut TNO voor Wiskunde, Informatieverwerking en Statistiek, The Hague (Netherlands).
Experiments with Multilingual Queries in a Multilingual Data Base.
T. Deheer. Jul 78, 29p IWIS-MEDEDEL-22

Information retrieval programs are described which allow for the ambiguities of natural language in searching. Information records consisting of pieces of various natural languages are attached to each other, leaving fuzzy semantic traces behind in the form of sets of three-letter-strings which were derived from the original texts. The system calculates an importance value for each possible answer to a user query. Queries are given in the form of a simple piece of language. Answers are communicated to the user, in descending order of importance value as calculated by the system.

PB80-172604 PC A03/MF A01
Reading, PA. USAC Project.
User Manual for the Vehicle Management Module. Reading Urban Information Systems Interagency Committee (USAC) Project. The Physical and Economic Development Subsystem for Reading, Pennsylvania.
May 75, 36p HUD-0000860
Contract HUD-H-1212

This report describes the Physical and Economic Development (PED) Subsystem developed by HUD for Reading, Pa., and a user's manual for the PED Vehicle Management (VM) Module. Reading is an industrial city of 84,000 people located 60 miles northwest of Philadelphia. HUD sponsors contracts to develop integrated municipal information systems, covering systems analysis, design, and implementation through evaluation and training. In contracting for the subsystem, Reading wished to develop an integrated municipal information system, supporting city operation, planning, and management, yet ultimately serving more than central Reading. PED modules are subdivisions of submodels. Seven submodels were established in conjunction with Reading officials: Land Records, Permits and Licenses, Water and Waste Management, Highways and Traffic Engineering, Public Works, and Planning, and Economic Development. The VM Module keeps city management informed about the amount of fuel used by city - owned vehicles. Data are supplied by the Daily Fuel Consumption Journal, and a monthly report of journal listings is compiled from a tape file of edited data. Two city bureaus keep and supply records, the Municipal Garage and the Bureau of Management Services. Details about providing data and data flow charts and examples of fuel consumption reports, are included.

PB80-172612 PC A02/MF A01
Reading, PA. USAC Project.
Orientation and Training for the Reading Physical and Economic Development Subsystem. The Physical and Economic Development Subsystem for Reading, Pennsylvania.
May 75, 12p HUD-0000861
Contract HUD-H-1212

From a series produced by Reading, Pa., covering activities of the Urban Information Systems Interagency Committee project, this report signals completion of the orientation and training (O&T) phase. The basic function of O&T is to facilitate the implementation of the Reading Physical and Economic Development subsystem and to ensure that the system can be maintained by city personnel. This task was accomplished by providing general orientation to city personnel and interested community groups, by maintaining continuous communications with city personnel, by constantly seeking to upgrade staff and city technical abilities, and by specialized training of city personnel who will use and maintain the system. Workshops and discussion sessions were frequently held covering such areas as the effect of hardware changes on future procedures and the exchange of information between school districts and the city government regarding the realities of a regional data processing network. Technical training was held onsite with knowledgeable staff members and weekly software meetings were held for module programmers. Training sessions also were conducted to acquaint data processing personnel with the data management technique. Finally, the specific training for the city personnel under each module is detailed including sewer and water accounts processing, geographic base file, standard permit processing, vehicle management, property assessment, traffic accident recording, and parts and supplies inventory. O and T materials are described.

PB80-172620 PC A02/MF A01
Reading, PA. USAC Project.
Data Access Control: Considerations.
Special technical rept.
May 75, 22p HUD-0000862
Contract HUD-H-1212

Prepared under a HUD contract with the City of Reading, Pa., for the Urban Information Systems Interagency Committee (USAC) Program, this report has two purposes: to meet Federal requirements and to serve as a guide to the city in dealing with the responsibilities inherent in all types of data collection, storage, and reporting. Rather than being an actual data access control plan, the report is a guide for creating such a plan. USAC has sponsored a contract to develop integrated municipal information systems and subsystems in several cities across the country. The phases and tasks performed in each USAC project include systems analysis, systems conceptualization, systems design, systems development, systems implementation, systems evaluation, orientation and training, organization and administration, research and evaluation, intra - USAC transfer, systems software development, geocoding, and confidentiality. Reading, Pa., was designated to develop a subsystem in physical and economic development (PED). (The content and scope of the PED modules, which are subsets of submodels, are examined.) During the project's second phase, systems conceptualization, seven submodels were identified: land records, permits; licenses, and inspections; highways and traffic engineering; water and waste management; public works; planning; and economic development. During the third phase, modules supporting the seven submodels will be designed. To begin designing a data access control plan (DACP), the city will need to establish criteria for categorizing private and public data and develop a set of internal system, computer center, and department / bureau controls to ensure that restricted and private data are released only to those specified departments or persons for which they are intended. The creation of a data access control board (DACB) will facilitate a DACP. Tabular data, footnotes, and an appendix about the DACB are included.

PB80-172638 PC A02/MF A01
Reading, PA. USAC Project.
Implementation Report of the Reading Physical and Economic Development Subsystem.
Final task completion rept.
May 75, 12p HUD-0000863
Contract HUD-H-1212

Efforts by Reading, Pa., to implement an urban information system are described in this report. Implementation is defined as the operation of the new system for some length of time with productive results. Although implementation did not occur in Reading, this report contains a description of user and city data processing staff implementation efforts. The eight modules used in various stages of implementation are reviewed. They include geographic base maintenance, maintenance of ownership, property assessment, parts and supplies inventory, standard permit processing, sewer and water accounts processing, traffic accident record, and vehicle management. Problems involved in the implementation process by the city's data processing staff include lack of desire to implement the urban information system and inadequate qualified staff. Although proposals focusing on staff increases -- adding a system analyst, an operations manager -- software programmer, and a data clerk -- have not been approved, a local consulting firm is reviewing the city's data processing problem to decide if the city should contract for facilities management or increase its staff. The available program specification documents are appended.

PB80-172646 PC A04/MF A01
Long Beach, CA. USAC Project.
Urban Information Systems Interagency Committee (USAC) Public Safety Information Subsystem.
1972, 70p HUD-0000865

A visual aid for presentations on the USAC concept and on the City of Long Beach, Calif., USAC Public Information system, this looseleaf compendium outlines basic details on the background of USAC and its approach and charts the components and functions of the City of Long Beach's system. The Urban Information System's Interagency Committee is chaired by HUD and has membership from 9 additional Federal agencies. The committee was formed to promote more effective local government and enhance urban information resources by establishing and perpetuating Federal, State, and local development of urban information systems. The approach is for totally integrated municipal information systems and subsystems with both horizontal and vertical relationships and interfaces. The Long Beach system will include finance, human resources, public safety, and physical and economic development subsystems. The public safety subsystem, the focus of this material, will include a police function, license permits and code enforcement, fire function, and civil defense. Each of these components' previous information control systems were analyzed prior to development of the integrated system. Purpose, processes, and information provided by each component under the integrated system are outlined and charted.

PB80-172786 PC A04/MF A01
Public Technology, Inc., Washington, DC.
Integrated Municipal Information Systems. Program and Projects of the United States of America Urban Information Systems Inter-Agency Committee.
Jan 75, 59p HUD-0000881
Contract HUD-H-2106R

Innovations in the research and development of integrated municipal information systems (IMIS) are discussed in this case study done for the Organization for Economic Cooperation and Development Directorate for Scientific Affairs. Also described are IMIS concepts, the program of the urban information systems Inter - Agency Committee (USAC), six city IMIS development projects, and the results of a 45 - day evaluation study. IMIS innovations cover four subsystems or sectors: public finance, public safety, physical and economic development, and human resources development. Innovative research and development features of USAC - IMIS projects include work on optimal transferability of prototype IMIS products, standards for identifying and classifying data, and research on and solutions to problems of data privacy, confidentiality, and access control. An evaluation study of selected program aspects and IMIS systems in Charlotte, N.C., and Long Beach, Calif., concluded that the system development was economically feasible and that most of the concepts and techniques could be transferred to other cities and counties with potential savings in development costs. The study recommended, however, that long - term 2 -

year contracts for cities, development of selected subsystems, a Federal transfer program, and a strengthening of the lead agency role and staff of HUD in the USAC program would improve the IMIS program. State and Federal distribution of services was also considered important.

PB80-172802 PC **A03**/MF **A01**
Long Beach, CA. USAC Project.
Computer Aided Fire Dispatch System. Module Integration Test Plan. Public Safety Information System.
8 May 74, 40p HUD-0000883
Contract HUD-H-1213

This report is one in a series covering analysis, conceptualization, design, development, and implementation of a public safety subsystem at the City of Long Beach, Calif. In this report, the module integration test plan (MITP) for the computer - aided fire dispatch system is described. Since the entire public safety subsystem at Long Beach is subdivided into various segments that are referred to as 'components,' the report refers to a component integration test plan (CITP) rather than a module integration test plan. The purpose, scope, and use of the CITP are described, as well as the performance criteria upon which the CITP is based and against which the component's performance is measured. The actual procedures that are used to administer and monitor the test are outlined, and the criteria used to evaluate the transition to and from an emergency backup system are described. The resources required to successfully administer a valid test are mentioned (hardware, software, personnel, facilities). Also included is a chart which illustrates the proposed time schedule for accomplishing the test. A sample program test selected from one of the component programs is appended.

PB80-172810 PC **A05**/MF **A01**
Long Beach, CA.
System Analysis Procedure Manual. Physical and Economic Development Subsystem.
26 Jun 72, 81p HUD-0000884
Grant HUD-CPA-CA-1012
Prepared in cooperation with Digital Research Corp., Newport Beach, CA.

The City of Long Beach, Calif., prepared this systems - analysis procedure manual as a guide to standards and procedures to be followed by all personnel assigned to the Systems Analysis Task and the future Municipal Information Systems analysis effort for the city's Public Safety Subsystem. The Systems Analysis Task will identify and document the current information process within the various city departments involved in activities relating to physical and economic development in order to discover decisions and interrelationships affecting day - to - day interdepartmental workflow. These findings will then be used as primary ingredients in developing the concepts for the improved system, along with its computer software, manual operating procedures, forms, etc. The analysis methodology has three general categories -- preinterview, interview, and postinterview -- which together encompass background materials, assembly, time - phased plan development, code development, orientation of management to planned project, activity analysis and data collection, data verification, narrative description of the work process for each activity, META DATA / 1 - set flow development, and report package compilation. Provided in this manual are preinterview and interview information, forms, and files reports; workflow diagram samples; flow chart conventions; file codes; META DATA / 1 system flow chart; editing error lists; number control and information logs; flow input sheets; and the time - phased plan outline.

PB80-172828 PC **A10**/MF **A01**
Long Beach, CA.
City of Long Beach Integrated Municipal Information System. Physical and Economic Development Subsystem.
Systems conceptualization task completion rept.
30 Apr 73, 221p HUD-0000885
Grant HUD-CPA-CA-1012
Prepared in cooperation with Mauchly Wood Systems Corp., Newport Beach, CA.

The City of Long Beach, Calif., presents the systems conceptualization task completion report regarding the physical and economic development subsystem (PEDS) of the integrated municipal information system. This report marks the end of the second major task in the development and implementation of the comprehensive, integrated, computer - based subsystem for the Departments of Building and Safety, Health, Planning, and Finance. The Fire Department, actually a participant in the public safety information subsystem, will also interface with PEDS. The conceptualization task, which followed analysis of the existing information processes in these departments, created a framework for detailed systems design. Its processes included aggregation of decisions made within and between departments, rationalization of information flow, and realization of a course system design. Primary emphasis was on a plan which would identify all major information elements, the role of these elements in binding together system components, and assurance of an incremental and orderly system implementation. Subsystem parts as conceived during the task are the inquiry, establishment, permit, complaint / referral, violation, and inspections components. Included in this report are discussions of data base considerations, hardware / software requirements, data base creation, design, maintenance, and administration, component descriptions, input and output specifications, process flow charts, and methodology.

PB80-172901 PC **A08**/MF **A01**
Public Technology, Inc., Washington, DC.
Department of Housing and Urban Development/Urban Information Systems Interagency Committee (HUD/USAC) Public Finance Information Systems Workshop.
Final project rept.,
16 Jan 76, 160p HUD-0000898
Contract HUD-H-2244R

Participant views and conclusions are presented from a workshop on public finance dealing with financial system transfer and the utility of two existing municipal systems selected for assessment (those of Dayton, Ohio, and Wichita Falls, Tex.). The workshop, held in March 1975, was attended by financial, management, and data processing officials from 20 municipalities. Among the conclusions reached by the participants were that (1) there is a genuine interest in financial system transfer, (2) the method for transferring information systems is not sufficiently understood or documented; (3) the systems presented have many desirable capabilities, and (4) the quality of information systems that can be obtained through transfer is much higher than the quality that can be achieved through internal development for the same cost. Recommendations resulting from the workshop activity are that local governments should jointly review systems for possible transfer, transfer must be standardized into a methodology that is understandable to local government management, a third party is needed to provide support to any transfer effort undertaken, and available information systems products must be compiled so as to aid investigation of systems for potential transfer. The appendices provide a list of project participants, Dayton and Wichita Falls module descriptions, a master registration list, workshop evaluation material, and a presentation of workshop planning and execution.

PB80-172919 PC **A10**/MF **A01**
Charlotte Consortium, NC.
Charlotte Integrated Municipal Information System Design Guide,
May 73, 206p HUD-0000907
Contract HUD-H-1216

The Charlotte Consortium, which consists of the city of Charlotte, N.C., the System Development Corporation, and the University of North Carolina, developed an Integrated Municipal Information System to handle the city's routine data needs and to provide information for planning. This description of the system development process lists the responsibilities of those working on the project, gives the timetable, and illustrates various steps taken to analyze and meet the city's information processing needs. Project development took place between 1970 and 1975. During this time the activities of each department were analyzed, overlapping data requirements were identified, data flow was restructured, and forms were redesigned. Three major considerations influenced the design philosophy: the division of the city's information and data processing functions into logical modules, the integration of these modules to provide planning data, and the transferability of the system to other cities. The final system includes not only software and data flow procedures but also built - in maintenance provisions. Samples of the system's use for purchasing, routine tax bills, and criminal justice records are given.

PB80-172943 PC **A07**/MF **A01**
Wichita Falls, TX. USAC Project.
Health Services Support Baseline Report. Urban Information Systems Interagency Committee (USAC) Municipal Information Systems Project, Wichita Falls, Texas.
Jul 74, 135p HUD-0000918
Contract HUD-H-1217
Prepared in cooperation with Kansas Univ., Lawrence. Inst. for Social and Environmental Studies.

Activities, manpower needs, and output are described in this preliminary report of the Nursing Division of the Texas Public Health Department in Wichita Falls, Tex. The report will be analyzed to provide estimations of the kinds and degree of significant changes an Integrated Municipal Information System (IMIS) would effect in personnel costs and responsibilities. The operations and manpower profile data presented here were assembled from an interview with the Director of the Nursing Division in June 1974 and represent the municipal operations within the Health Services Support Application and the integration of the Nursing Division with other city departments. Most of the interaction appears to be within the Nursing Division itself and with users outside the city organizations. Nursing Division activities are reported in school health, tuberculosis control, maternity and child health, dental health, general communicable disease program, venereal disease program, and children's services. Activity information is broken down into the trigger for the activity (e.g., end of the school year), the forms and files used, the output files and reports, and users. Manpower data address the activity frequency per year, the total estimated hours per year expended on each activity, and the direct labor costs for that activity as determined by the average hourly pay rate for 1974. Each operation is broken down by type of personnel involved (supervisory, clerical, or operational). Major municipal and nonmunicipal users are identified, and possible cumulative effects on management are assessed. Space is provided on the data sheets for recording post - IMIS implementation data. Appendices supply manpower cost calculations, budget information for 1973 - 74, and job descriptions obtained in April 1974.

PB80-172950 PC **A04**/MF **A01**
Wichita Falls, TX. USAC Project.
Purchase Order Processing System. Application Evaluation Report.
Special technical rept.,
J. Terry Edwards, and Elizabeth Mercer. Feb 75, 56p HUD-0000920
Contract HUD-H-1217
Prepared in cooperation with Kansas Univ., Lawrence. Inst. for Social and Environmental Studies.

This report, the first in a series of 10 Application Evaluation Reports, evaluates the functioning of the purchase order processing module of the Wichita Falls, Tex., Integrated Municipal Information System. The module consists of three programs. The Budget Account Status Check program tells the purchasing department the status of each user department's account. The Vendor Selection program assists in selecting a vendor, or vendors when solicitation of bids is required. The Create Daily Purchase Orders program produces the purchase orders and updates vendor ratings and department account files. On - line display terminals show purchasing department personnel immediately whether a department has enough money in its account to make a purchase. If it does not, the requisition order is returned so budget transfer procedures can be started. The on - line terminals also tell personnel about any delivery problems experienced and the status of any orders pending with a vendor. Data from the completed purchase orders are used to combine budget information, develop user profiles, identify opportunities for bulk purchasing, and control budget over-

draws. The system saved $811 in direct labor costs despite salary increases. Appendices explain the method used to determine manpower costs for the system, give the 1972 - 73 and 1973 - 74 budgets for the purchasing department, and contain job descriptions for purchasing department personnel.

PB80-178056 Not available NTIS
National Bureau of Standards, Washington, DC.
Federal Data Banks as Potential Information Resources to Meet the Needs of Local Communities.
Final rept.,
P. W. Berger. Feb 80, 6p
Pub. in Journal of Spec. Lib. 71 n2 p77-82 Feb 80.

The article reports potential impacts of the November, 1979 White House Conference on Library and Information Services deliberations on Federal libraries and Federal information services. Public access to Federal libraries, data bases and information services was a major concern to the Conference Delegates, as were questions of networking and network design.

PB80-178551 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
How a Medical Information System Affects Hospital Costs: The El Camino Hospital Experience.
Research summary series 27 Nov 72-31 Jul 79,
Rosanna M. Coffey. Mar 80, 30p NCHSR-80-20, DHEW/PUB/PHS-80-3265
Contract PHS-HSM-110-73-0331

This report describes the results and analysis of the Battelle Columbus Laboratories' assessment of the economic impact of the Technicon Medical System (TMIS) at El Camino Hospital, Mountain View, California. Estimates of the economic impact of TMIS at El Camino Hospital were calculated. The results indicate that the system improved productivity in the medical care departments and caused an overall reduction in patient length-of-stay. From a total hospital cost perspective, however, the results were not definitive. Under the assumption that support department cost increases that were found were not directly caused by TMIS, the system was estimated to be approximately 60 percent self-supporting in 1975. The report looks at the implications of this study for other hospital settings.

PB80-182512 PC **A02**/MF **A01**
Executive Office of the President, Washington, DC. Office of Administration.
A Guide to Publications of the Executive Office of the President. Volume 2, Issue 1.
Mar 80, 14p
See also Volume 1, Issue 3, PB80-176043.

Publications issued by the 11 agencies of the Executive Office of the President address a broad range of subjects relating to the policy-making aspects of the executive branch of the Federal government. The Publications Management Program is managed by the Office of Administration. A major objective of the program is to ensure professional and economical publishing practices within the EOP and the timely announcement and accessibility of publications to the EOP staff and to the general public. Apublications liaison group, made up of one staff member from each of the EOP agencies, acts as a link between the program and the agencies. This issue of the Guide contains citations issued between January 1, 1980 and March 31, 1980. Publications are grouped by sponsoring EOP agency, and the source of availability is given for each publication.

PB80-183726 MF **A01**
Oklahoma State Univ., Stillwater. Center for Local Government Technology.
An Information System for Small Police Departments,
James E. Shamblin, and Thomas J. McLean.
1975, 99p NSF-RA-G-75-015
Grant NSF-GI-34670

The report describes an information system suitable for use by a police department in a small city. It evolved from a study of the means of providing the informational needs of the city of Stillwater, Oklahoma. The computer programs and modifications are currently in use in Stillwater and Norman, Oklahoma, and permit these small cities to determine quickly and accurately when and where police services and equipment are required. The system is oriented toward providing the police chief with summarized data in tabular form for accuracy and in graphical (bar chart) form for ease of interpretation. The system requires the minimum possible amount of data recording. The software has been written in Fortran IV and is designed to permit batch processing on a monthly basis, which could be done by a non-city-owned computer. The programs are individual, to provide flexibility in selecting the desired information. Extensive descriptions are included on the information base, the scheduling model, software packages, uniform classification code, and a program output that lists time summary, location summary, officer activity summary, and police scheduling program.

PB80-185762 PC **A03**/MF **A01**
California Univ., San Diego, La Jolla. Inst. of Marine Resources.
California Sea Grant College Program. A Summary 1978-1979.
Annual rept.,
Dale Ingmanson, and Louise Eklund. 1980, 45p
SG-71, IMR-80-101, NOAA-80040902
Grant NOAA-04-8-M01-189
See also report dated 1979, PB80-112071.

In 1978-79 there were Sea Grant projects at seven University of California campuses, and at several state universities, state university laboratories, and private universities. Research projects on coastal resources, aquaculture, fisheries, new marine products, and energy were supported during 1978-79. Continuing support was also provided for a substantial Marine Advisory Program, as well as a variety of academic and public education activities throughout the state. In this summary, progress is highlighted by describing some of the many projects supported by Sea Grant throughout the state.

PB80-188287 PC **A99**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ.
Hospital Organization and Computer Technology: The Challenge of Change.
Final rept. 1 Jun 69-31 May 72,
Coralie Farlee, and Bernard Goldstein. Sep 72, 1040p NCHSR-80-46
Grant PHS-HS-00245

This is an assessment of the impact of the implementation of a computer-assisted hospital information system. The study reports 5 years of research utiiizing available records, (staffing assignments, PAS reports, meetings), surveys, interviews and observation (including the sampling of work). The conceptual framework is that of organizational theory; indicants of relevant variables reflecting the process of change and outcomes are analyzed with methodological rigor. Findings are reported concerning the responses of various levels of the receiving organization as well as the effectiveness of the many applications. Also reported are conclusions concerning the implementation process and the kind of knowledge and expertise needed by the receiving organization to make the most effective use of the potential of such a computer-based information system. This study also contains the model protocol for use in assessments of the impact of computer-based medical information systems.

PB80-810823 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Copyrights, 1964-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-May 80,
Mary E. Young. Jun 80, 145p
Supersedes NTIS/PS-79/0574 and NTIS/PS-78/0529.

Information on national and international copyrights is reviewed in the reports cited. Citations on the problems of copyrighted materials in computer data bases and of photocopying are included. (This updated bibliography contains 138 abstracts, 17 of which are new entries to the previous edition.)

5C. Economics

AD-A083 709/6 PC **A07**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
An Analysis of Discounting Procedures and Risk Analysis Techniques for Use in the Department of Defense.
Master's thesis,
Dennis D. Dailey. Dec 79, 140p Rept no. AFIT/GSM/SM/79D-16

In this study the writer examines the debate over the choice of an appropriate discount rate for evaluating public investments. The conclusions drawn from the study are then applied to investment decisions within the Department of Defense. Two major issues are examined in detail. In the first, the social time preference discount rate is rejected, for both practical and theoretical reasons, in favor of an opportunity cost of capital rate which considers the alternative use in the private sector of the funds used in public investment projects. The second point of controversy centers on the use of a riskless discount rate versus a rate that includes the risk compensation for private investments. The riskless discount rate is rejected because it does not adequately portray the opportunity cost of public investment funds.

AD-A083 884/7 PC **A14**/MF **A01**
Institute for Defense Analyses Arlington VA Program Analysis Div
Economic Efficiency in the Management of DCS Services.
Final rept.,
William F. Beazer, James P. Bell, George C. Daly, J. Fred Giertz, and Wendy Lee Gramm. Sep 79, 304p IDA-S-513, IDA/HQ-79-21696, AD-E500 146
Contract DAHC15-73-C-0200

This study analyzes the impact of certain DCS policies and practices on the economic efficiency of communications services. It finds that: (1) present methods of offering and pricing subscriber services create inappropriate incentives for user choices; (2) exclusion of depreciation and certain other expenses from subscriber charges seriously distorts the relative prices of alternative services; and (3) assignment of responsibility for procurement funding affects both the choice and the cost of DCS services. (Author)

AD-A083 956/3 PC **A07**/MF **A01**
Army Military Personnel Center Alexandria VA
Institutionalization of Rural Credit in India: A Focus on the Cooperative Credit Movement.
Final rept.,
Richard Kenneth Rankin. May 80, 131p
Master's thesis.

Since the turn of the twentieth century, there has been an effort in India to replace the usurious moneylender with institutionalized forms of rural credit. This attempt became more critical with the coming of the Green Revolution (1960's) and the associated increase in demand for rural credit. Primarily the Government of India has relied on the Cooperative Movement in its effort to institutionalize the supply of rural credit. This thesis examines some of the major problems and obstacles encountered as well as corrective measures taken with respect to the cooperative movement. (Author)

AD-A084 071/0 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Pronouncement of the Minister of Communications Edward Kowalczyk on Communications Trade Day on the Occasion of 'Soviet Science and Technology Day'.
15 Apr 80, 14p Rept no. FTD-ID(RS)T-0256-80
Edited trans. of Wiadomosci Telekomunikacyjne (Poland) n10 p289-292 1977, by Anthony M. Angiletta.

No abstract available.

BNL-51064 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Probabilistic Interpretation of Market Shares.
A. Gerasoulis, and A. S. Kydes. Dec 79, 49p
Contract EY-76-C-02-0016

The focus of this paper is the development of a steady-state (long-term) characterization of the

market-allocation process under uncertainty in prices of delivered products. The generic method was developed with a view toward incorporation of the methodology within large-scale energy models such as the LEAP model of the US DOE or the TESOM model of Brookhaven National Laboratory. 19 references, 5 figures. (ERA citation 05:015861)

CONF-800128-1 PC **A03**/MF **A01**
Argonne National Lab., IL.
Analysis of Brokerage Feasibility for Unit Coal Train Shipments to the Midwest.
R. Knorr, S. Vezeris, and K. Wilkie. 1980, 28p
Contract W-31-109-ENG-38
59. annual meeting of the Transportation Research Board, Washington, DC, USA, Jan 1980.

The purpose of this study is to determine the feasibility of aggregating industry and utility demand for coal and serving the demand through a local brokerage operation to reduce transportation cost. This cost saving is associated with the economy of scale of unit train shipments. The delivered price of western coal is calculated for local users in a given midwest subregion based on present utility and industrial coal demand. The broker operation would consist of unit train hauls from western mines, a receiving and storage terminal, local truck or rail transportation from the terminal to each user, and possible transshipment to distant waterfront users. The research focuses on the Green Bay, Wisconsin area. Applicability of this brokerage concept to other areas receiving western coal shipments is also discussed. (ERA citation 05:014741)

DIB-80-07-511 PC**$10.00**/MF **A01**
Pacific Projects Ltd., Tokyo (Japan).
Korean Market for Communications Equipment and Systems.
Foreign market survey rept.
Feb 80, 180p
U.S. sales only for 8 months. Available to foreign addressees in Feb 81.

The market research was undertaken to study the present and potential US share of the market in Korea for communications equipment and systems; to examine growth trends in Korean end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to suceed in Korea were also reviewed.

LA-8039-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Costs of Coal and Electric Power Production: The Impact of Environmental Control Technologies for Coal-Cleaning Plants.
E. F. Thode, J. M. Williams, E. M. Wewerka, and P. Wagner. Oct 79, 25p
Contract W-7405-ENG-36

Costs of 10 alternative environmental control technologies were calculated for three hypothetical and three actual cleaning plants. The cost of lime-limestone slurry coating ranged from $0.22 to $0.50 per ton of product coal. For one actual plant cleaning high-sulfur coal, the range of costs for the 10 alternatives was from $0.076 to $9.89 per ton of product coal, based on March 1978 costs. For the purpose of supplying electric utility customers, coal cleaning reduces the cost of meeting environmental standards because it is less expensive (potentially) to control the water pollution from the coal-cleaning plant than the air pollution from the utility power plant. Applying the less expensive environmental control technology options to coal-cleaning wastes adds approximately 0.2 to 0.4 mills/kWh to the costs of electric power production. (ERA citation 05:013023)

NUREG/CR-1135 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
An Econometric Study of Electricity Demand by Manufacturing Industries,
Hui S. Chang, and Wen S. Chern. May 80, 65p
ORNL/NUREG/TM-358
Contract W-7405-ENG-26

The report presents an econometric model of electricity demand for the Standard Industrial Classification (SIC) three-digit manufacturing industries in the United States. Previous studies on the demand for electricity by manufacturing industries are reviewed briefly. The specification of the model, which consists of a demand and a price equation, is discussed. Estimation, dynamic-simulation, and forecasting results for each of the 16 industry groups (15 SIC three-digit industries plus one for all remaining industries) are presented. The econometric results show that the demand and the price equations, specified and estimated, reflect reasonably well the dynamic adjustment processes of industrial demand for electricity. Estimated results reveal that there are substantial interfuel substitutions in manufacturing.

N80-23210/1 PC **A06**/MF **A01**
Scientific Systems, Inc., Cambridge, MA.
Wheat Forecast Economics Effect Study.
Final Report.
R. K. Mehra, R. Rouhani, S. Jones, and I. Schick.
May 80, 117p NASA-CR-3286
Contract NAS5-25463

A model to assess the value of improved information regarding the inventories, productions, exports, and imports of crop on a worldwide basis is discussed. A previously proposed model is interpreted in a stochastic control setting and the underlying assumptions of the model are revealed. In solving the stochastic optimization problem, the Markov programming approach is much more powerful and exact as compared to the dynamic programming-simulation approach of the original model. The convergence of a dual variable Markov programming algorithm is shown to be fast and efficient. A computer program for the general model of multicountry-multiperiod is developed. As an example, the case of one country-two periods is treated and the results are presented in detail. A comparison with the original model results reveals certain interesting aspects of the algorithms and the dependence of the value of information on the incremental cost function.

PB80-172372 PC **A09**/MF **A01**
Washington Univ., St. Louis, MO.
Urban Redevelopment Through Tax Abatement: The Missouri Chapter 353 Program.
Daniel R. Mandelker, Gary Feder, and Margaret R. Collins. 1979, 193p HUD-0000814

A special set of urban development statutes, unique to the State of Missouri, combine the right of eminent domain for private developers with a tax abatement program to encourage private redevelopment. This Chapter 353 program is subject to controversy because it has been used primarily for the commercial redevelopment of downtown St. Louis. Critics charge that this redevelopment would have taken place anyway and that the tax loss exceeds the redevelopment gain. Two surveys, one commissioned by HUD and one by the city of St. Louis, came to opposite conclusions about the importance of Chapter 353 to developers, but the surveys used differing methodology. It is probably true, however, that tax abatement helped to lure developers to the decaying downtown area. Court challenges have affirmed that the program, which is written into the Missouri constitution, is legal. A special study found that tax - abated projects will generate an estimated $72.6 million in excess of the total revenue foregone. This may not be applicable in other cities, however, as the property tax is a relatively minor source of income for St. Louis. If the program were used for rental housing, tax abatement would represent a reduction of $20 per month in rent. It could also mean a 16 percent reduction in mortgage payments for ownership housing. The issue of its use for commercial versus housing purposes is best handled by the political process. Its effectiveness in revitalizing downtown St. Louis is evident. Extensive notes and appendices contain references and additional data.

PB80-172448 PC **A08**/MF **A01**
National Urban League, Inc., Washington, DC. Research Dept.
Compendium of Profiles of Economic/Job Development Strategies Using Community Development Block Grant Funds Directed Toward Low-Income and Disadvantaged Groups.
Final rept.,
Robert B. Hill, Emory West, and Austin Penny. 30 Dec 77, 170p HUD-0000830
Grant HUD-H-2546RG

These profiles, developed by the National Urban League, of 20 selected localities show how they used the Community Development Block Grant (CDBG) Program as a major resource for economic and manpower development projects. Both project reports and site visits were used to develop these descriptions. Each profile, divided into 10 sections, contains a description of the locality, the name and address of a contact person, and data on the size of the city together with its form of government. The profile then gives a demographic background describing the percent of blacks and Hispanics in the locality, the number of persons living below the poverty level, and the areas' economic and employment situation. The remaining sections describe the program's scope and purpose, specific activities undertaken, and the use of CDBG funds to fulfill the purpose. Complementary programs and the involvement of other community groups are reviewed along with actual program accomplishments. A matrix matches localities with the type of CDBG activity funded. This review covers job development efforts in Chicago, Ill.; Los Angeles, Oakland, and San Diego, Calif.; Philadelphia and Lancaster, Pa.; Baltimore and Glenarden, Md.; Milwaukee, Wis.; New Orleans, La.; Kansas City, Mo.; Atlanta, Ga.; Buffalo and Rochester, N.Y.; Toledo and Dayton, Ohio; Newark and Plainfield, N.J.; Worcester, Mass.; and Hartford, Conn. An index and references are appended.

PB80-172463 PC **A04**/MF **A01**
National Urban League, Inc. Washington, DC. Research Dept.
Effective Job Development Strategies for the Disadvantaged Using Community Development Block Grant Funds.
Final rept.,
Robert B. Hill, Emory West, Austin Penny, and Cheryl Randall. 30 Jun 78, 58p HUD-0000832
Grant HUD-H-2546RG

A strategy to increase employment among low - income and economically disadvantaged groups must combine industrial and economic development, strategies, small business development, skills development, the marshaling of community resources to aid persons in need of jobs, and job creation for the chronically unemployed. A National Urban League review of cities which have used Community Development Block Grant funds for job development finds that money used for industrial and economic development has gone into land acquisition, demolition and clearance, site improvements, studies, and other activities, with little being accomplished in the way of attracting jobs to poor neighborhoods. This lack of job strategies is partly due to a lack of policy direction, and to the time - lag which characterizes government activity. Private businesses often hesitate to cooperate with such schemes because of the time lost due to administrative indecision. However, in Baltimore, Md., small business development has been more successful, especially when it has been combined with neighborhood revitalization programs. Many cities have put together employment packages using financial aid from a number of Federal and local sources. In addition, skills development, job training, and community aid programs have been the most visible components and generally have successfully placed trained persons in public or private sector jobs. Finally, projects which have addressed the chronically unemployed have had mixed success. Although training is adequate, job placement has proved to be difficult. No references are provided.

PB80-172471 PC **A05**/MF **A01**
Cornell Univ., Ithaca, NY. Program in Urban and Regional Studies.
Applications of Centrographic Techniques to the Study of Urban Development: The Growth of Atlanta, 1940-1975.
Task I rept.,
Barclay G. Jones, Donald M. Manson, and Harry N. Coccossis. 15 Sep 78, 77p HUD-0000837
Grant HUD-H-2914RG

Results of a study to explore the application of centrographic measures to the analysis of urban development in Atlanta, Ga., over a 35 - year

period are presented. The results reflect the first of a 3 - phase project undertaken in the summer and fall of 1978. This phase, largely preoccupied with methodological concerns, used five points in time for a major metropolitan area of a million and a half people. A wide range of centrographic measures were calculated, and the performance of the measures was entirely satisfactory. Their changing values showed considerable stability in spite of dramatic changes in the magnitude of the data measured and distribution changes that occurred. The summary measure of location, when applied to three different phenomena, (i.e., total population, black population, and income), demonstrated considerable consistency of movement in terms of both distance and direction. The measures of dispersion that were used, the average and standard radius, and the mean moment ratio evidenced similar stability to a marked degree. The method of calculating the density gradient proved satisfactory and produced plausible and stably changing results. The application of the measures to the changing phenomena under study also satisfactorily displayed their capability to describe and calibrate the changes taking place; the center of location moved at a plausible rate in a plausible direction. Measures of dispersion and shape proved particularly powerful in describing the growth and distributional phenomena of a subgroup of the population, blacks. Although the capability of generalizing from a pilot project may not be extensive, a solid foundation surely has been created for subsequent phases of research, focusing on other aspects of population such as income subgroups and comparisons within. In this study, centrographic measures have proven to be useful for the simplicity with which they depict spatial and distributional characteristics of various phenomena. Tables, figures, and maps are provided.

PB80-172489 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY. Program in Urban and Regional Studies.
Applications of Centrographic Techniques to the Study of Urban Development: Theoretical Implications of the Expansion of Atlanta.
Task II rept.,
Barclay G. Jones, Donald M. Manson, and Harry N. Coccossis. 1 Oct 78, 24p HUD-0000838
Grant HUD-H-2914RG

Urban and regional theory, urbanization theory, local theory, and intraurban location and distribution theory were all used to pick the factors to be measured in a centrographic study of the growth of Atlanta, Ga. The study used mapping techniques to trace the changes in total population, income distributions, locations of industry, and racial distribution for the years between 1940 and 1975. This centrographic study showed that traditional expansion patterns took place; previously rural land around the edges of the city was used for housing, the mortgage market created new wealth, and a shift occurred in the center of activities. In Atlanta the higher income growth was to the north of the city with lesser income groupings arranged in a series of quadrants ending with the lowest income growth south of the city. In this study the centrographic techniques lead to useful insights concerning relationships between urban theory and empirical evidence. Such techniques can also have practical application. By identifying areas of growth and decline in population, employment, land values, and markets, centrographic measures can be useful in the planning of facilities and services, anticipating rises and declines in sales and revenues, and predicting the distribution of future service loads. This discussion briefly summarizes the findings of the Atlanta study, citing the urban growth theory upon which the particular submeasurement was based. The general adaptability to transfer of the technique is emphasized. References are appended.

PB80-172497 PC **A11**/MF **A01**
Cornell Univ., Ithaca, NY. Program in Urban and Regional Studies.
Applications of Centrographic Techniques to the Study of Urban Development: The Expansion of Metropolitan Atlanta, 1940-1975.
Task III rept.,
Barclay G. Jones, Donald M. Manson, and Harry N. Coccossis. 20 Dec 78, 239p HUD-0000839
Grant HUD-H-2914RG

Traditional urban study models, which emphasize the roles of transportation and industry in defining the city's growth, are tested by using centrographic techniques to analyze the growth of Atlanta, Ga., since World War II (1940 - 1975). Centrographic techniques map changes as functions of location, shape, and dispersion. The bulk of this highly theoretical discussion consists of maps tracing the changes in Atlanta's total population, its black population, income distribution, housing, mobility of population, and employment. Traditional theory assumes that a city grows outward from a central ring and that newcomers increase the density of the central city by converting the homes of the wealthy into tenaments. In Atlanta, newcomers settled in housing developments around the edge of the city. These developments displaced lower - income and moderate - income fringe residents, who were dispersed even further. Industries also developed on the edge of the city, commuting times lengthened, and transportation decreased as an important consideration in housing and employment location. The black population grew rapidly, concentrating in a single section of the city on an east - west axis running through the central business district. This vector of growth was at more than a 90 degree angle to the vector of growth for the region, removing blacks from new job opportunities. These and other complexities of urban behavior, not explained by current models suggest the need for new theories. Extensive notes and references are appended.

PB80-172513 PC **A02**/MF **A01**
National Council for Urban Economic Development, Washington, DC.
Coordinated Urban Economic Development: A Case Study Analysis.
Executive summary,
John Nixon, Lawrence P. Malone, Victor Hausner, Kevin Balfe, and Rita Bosek. Mar 78, 17p HUD-0000844
Contract HUD-H-2274

This report gives 22 case examples of innovative ways in which cities are coordinating public resources and collaborating with community organizations and the private sector to stimulate local economic development. Traditionally, cities have approached development in a piecemeal fashion. Programs have been developed to deal with specific problems such as urban renewal, housing rehabilitation, or business loans. Cities which attempt to coordinate development efforts usually establish a comprehensive development line agency, set up a coordinative staff approach, or devise some combination of the two. The type of structure a city creates depends upon its economic situation (those with declining economies may require a comprehensive institution to pursue an interventionist strategy), the system of government, political considerations, and private sector input. Comprehensive economic development planning is a new concept which will require significant changes in many city planning activities. Data must be gathered at the neighborhood level and attention must be given to different sectors of the economy. To date few cities have used Community Development Block Grant program funds to involve the private sector in community development. However, only by leveraging private investment can long - term community gains be realized. The case studies illustrate several development financing techniques used by local governments, including front - end investment capital, low - interest financing and tax breaks to improve cash flow, and reduced risk.

PB80-172521 PC **A04**/MF **A01**
Tufts Univ., Medford, MA. Dept. of Economics.
Feasibility of Research on Metropolitan Area Tax Base Sharing and Business Development Patterns.
Final rept.,
Andrew Reschovsky. May 79, 66p HUD-0000848

The impact of the Minnesota tax base sharing plan on the spatial pattern of economic growth and development within the Twin Cities area, the fiscal costs to local governments of new business development, and the comparative fiscal costs of new business development in central cities, suburbs, and rural locations are examined. In exploring the impact of the Minnesota tax base sharing plan in the spatial pattern of economic growth and development within the Twin Cities area, attention is given to the problems of distinguishing between inflationary growth of the assessed valuations of existing commercial - industrial properties and the growth of assessments due to new developments. Based on interviews with local officials, the availability of data on regional development patterns is explored. Conclusions are drawn about the likely impact of base sharing on urban development, and suggestions are provided for steps HUD might take to measure and evaluate these impacts. In finding current techniques for measuring the fiscal costs to local governments of new business development deficient, an alternative conceptual model for predicting costs is developed. The report concludes with a brief evaluation of the fourth year of the operation of tax base sharing. A series of tables summarizes the distributive impacts of base sharing in 1977.

PB80-172547 PC **A05**/MF **A01**
Abt Associates, inc., Cambridge, MA.
What Families Spend for Housing. The Origins and Uses of the 'Rules of Thumb'.
Terry S. Lane. 27 Sep 77, 97p HUD-0000850
Contract HUD-H-2527

The rule of thumb that families should spend about a fourth of their incomes for shelter originated in the late 19th century when a week's wages for a month's rent was the common practice. With time, it has become apparent that this rule does not describe the actual relationships between shelter expenditures and income very well and is not able to meet the multiple goals of mortgage lenders and housing policy planners. In 1970 only 13 percent of American households paid 20 to 25 percent of their gross incomes for rent. A 1973 study in Boston found the amount ranged from 37 to 49 percent for those with annual incomes of $3,000, down to a range of 23 to 28 percent for those with incomes over $7,800. Although lenders and rental agents use the rule of thumb to screen out prospective borrowers and tenants who might not meet their monthly payments, most defaults and foreclosures are associated with unstable incomes or unexpected family crises (unemployment, exceptional medical bills, or divorce), not ratio of income spent for shelter. It is not clear at what point housing expenditures may become too burdensome. The rule is also an inappropriate guideline for Federal housing programs; more comprehensive criteria which consider the total family situation are needed. The report contains statistical tables, extensive references, and appendices.

PB80-172562 PC **A02**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of the Assistant Secretary for Policy Development and Research.
Federal Policy Options for Property Tax Relief.
Executive summary.
8 Sep 77, 23p HUD-0000853

Four policy alternatives could be used by the Federal Government for State and local property tax relief. Such relief has been sought to reduce the regressivity of the property tax, shield low - income households from large tax liabilities, enable the elderly to retain their homes, slow neighborhood deterioration, and make citizens more willing to finance urban improvements. Two of the alternatives directly relieve the tax burdens of eligible individuals while also relieving the fiscal burden of State and local governments -- Federal cost sharing of the State circuit breaker programs and Federal income tax credit of property taxes for low - and moderate - income taxpayers. These two programs both extend to renters, for whom a portion of rent is assumed to be a property tax payment. The 1974 cost of circuit breakers to State and local governments was $500 billion annually in 21 States. It is assumed that a Federal cost sharing program in conjunction with State circuit breakers would induce other States to institute similar programs. The impact of the tax credit is undetermined. Two other proposals, mismatch revenue sharing and expansion of Federal aid to education, indirectly impact property taxes by improving the fiscal capacity of poor areas and large central cities. The mismatch program is directed at cities with populations of 200,000 or more, for whom the problem of mismatch between fiscal capacity and service needs is greatest. Tables estimate the costs of each program, and footnotes give additional data and references.

PB80-172588 PC **A06**/MF **A01**
Urban Inst., Washington, DC.

Place to Place Indexes of the Price of Housing: Some New Estimates and a Comparative Analysis.
James R. Follain, Larry Ozanne, and Verna M. Alburger. Jul 79, 111p HUD-0000855
Contract HUD-H-2162R

Variation in the cost of comparable housing among 39 Standard Metropolitan Statistical Areas (SMSA) is examined to provide new, constant - quality cross - sectional indexes of the price of housing. The indexes are calculated using Annual Housing Survey data from 1974 and 1975 and are for both owner - occupied and renter - occupied units. The methods used to make inferences about the price per unit of housing services are hedonic indexes, based on the assumptions that a housing unit is not a single heterogeneous unit, but rather a bundle of dwelling characteristics and each of these characteristics has its own price which can be estimated by multivariate regression analysis, and the Bureau of Labor Statistics (BLS) method. In this second method, a particular type of housing bundle is specified; then all dwellings within a particular SMSA with similar characteristics are selected, and the average rent of the selected units is computed. The procedure is repeated in other SMSA's, using the same set of selected housing characteristics. The resulting schedule of average rents constitutes the BLS - type rental price index. Major findings derived from constructing these two types of indexes are: (1) significant variation exists in housing prices across SMSA's, using both index procedures; (2) the indexes generally agree on which SMSA's have more and less expensive housing and are sensitive to changes; and (3) the hedonic index is relatively insensitive to the metropolitan and intrametropolitan location of the reference bundle, and the inclusion or exclusion of neighborhood characteristics. Thesappendix provides a hedonic variables list; a bibliography is included.

PB80-172711 PC **A03**/MF **A01**
American Society of Planning Officials, Chicago, IL.
Windfalls For Wipeouts: Land Value Capture and Compensation.
Executive summary,
Donald G. Hagman, and Dean J. Misczynski. May 78, 26p HUD-0000872, HUD/PDR-307

Windfalls (benefits deriving from increased land values as a byproduct of government land - use regulation or other causes not directly involving the owner) should be partially recaptured to help compensate for wipeouts (losses from decreased land values having the same origin), thus reducing inequities. This is the theme of 'Windfalls and Wipeouts,' a booklet international in scope and based on experiences of five countries -- Australia, New Zealand, Canada, England, and the U.S. Summarized in this booklet (the work), covers all known techniques of mitigating and recapturing windfalls and wipeouts from land - use planning and regulation and also deals with economics, law, and planning. Two models introduce readers to both a comprehensive system for dealing with windfalls and wipeouts and a limited system for mitigating wipeouts from land - use controls and recapturing windfalls sufficient to fund those payments. The techniques used in these models are detailed individually. They include (1) nuisances of private parties -- court - ordered termination of private or public nuisance or compensation for damage, (2) government nuisance -- government payment of damages, (3) taking -- owner - initiated inverse condemnation damages, (4) planning and regulatory acquisition, (5) compensatory regulation, (6) special assessments to recapture increments, (7) recapture under reclamation law, (8) exactions on development permission, (9) impact taxes on windfall earnings, (10) sale of development permission, (11) land - value taxation, (12) the Uthwatt proposal to reassess land values every 5 years, (13) transfer taxes or sales tax based on real property value at transference, (14) special capital and windfall real estate taxes, (15) government compensation for landowners suffering financially from downzoned land, and (16) transfer of development rights. The book is a reference for land economists, planners, and lawyers.

PB80-172745 PC **A07**/MF **A01**
Brookings Institution, Washington, DC.
Report on the Allocation of Community Development Funds to Small Cities.
22 Nov 78, 129p HUD-0000876
Grant HUD-H-2899RG

This study presents alternative systems for allocating community development block grant (CDBG) funds to small cities, using data drawn from a sample of 1,962 municipalities and townships of under 50,000 population, along with a comparison group of 449 cities above 50,000 population. The study also partly fulfills the requirement of the 1977 amendment by Senator James R. Sasser to study small cities and alternative funding formulas for the CDBG program. Findings of the analysis were that (1) community problems and needs differ most between small nonmetropolitan cities on the one hand and between small metropolitan and large cities on the other, (2) poverty - oriented factors are better indicators of nonmetropolitan distress than community are, (3) availability of current data should be considered in making further formula changes, and (4) policymakers should analyze other funding sources before making final decisions on changing CDBG fund distribution. Comparative analysis of three groups of cities -- small, nonmetropolitan, and large -- revealed that small, nonmetropolitan cities are in much greater need of funds than small metropolitan cities. Suggested formula alternatives include substituting factors into the present system, using impaction formulas and measures of concentrated problems, lowering population entitlement threshold to 25,000, and using a general revenue sharing approach to allocate CDBG nonmetropolitan funds. A total of 51 tables are included.

PB80-172851 PC **A03**/MF **A01**
Denver Univ., CO.
Rangely Commercial Development Project, Rangely, Colorado. Public Administration Field Service Program for Energy-Impacted Communities.
Project rept.,
James F. Geyler. Jun 78, 34p HUD-0000892

The Rangely Commercial Development Survey Project was designed to identify ways in which the town of Rangely, Colo., (pop. 2,000) could expand its commercial sector and, therefore, its revenue base. Rangely, like other energy - impacted communities, has suffered from successive development impacts since World War II, including a severe housing shortage, retarded commercial development, and a transient resident attitude. Two purposes of the project, designed with the help of the Public Administration Field Service Program, were to identify the basic reasons residents shopped outside Rangely and to decide what, if anything, could be done to improve existing businesses and attract new ones. Survey results showed that most Rangely residents bought most of their retail goods and services in neighboring markets because of high prices, lack of availability of items, and lack of choice. The survey concluded that a substantial part of the business lost to Rangely could be recovered through additional effort and good marketing and business practices; and that town leaders, with the help of residents, should actively solicit new business. Tables, figures, and appendices are included.

PB80-172984 PC **A05**/MF **A01**
California Univ., Berkeley. Inst. of Governmental Studies.
Allocating the One Percent Local Property Tax in California,
Thomas Fletcher, Dennis Hermanson, John Taylor, Shirley Hentzell, and Dean Linebarger. Mar 79, 83p HUD-0000928
Grant HUD-H-2944G

The California Commission on Government Reform, established in the wake of Proposition 13, presents this report on allocating the 1 percent local property tax in the State; it is one in a series of reports. The present California law provides for distribution of property taxes at a fixed rate insensitive to the dynamics of city growth and change. The proposed formula - based allocation system is not subject to preferences of individual government offices; the basis is the same for every jurisdiction, and it can be relied on over time. The formula is complex enough to account for major considerations in allocation but simple enough to be easily evaluated, tested, and implemented. Because one - factor and two - factor allocation formulas fail to account for the historic distribution or property tax revenues, a three - factor formula is suggested. The formula, though different for individual jurisdictions, basically includes need (population for cities and counties, average daily attendance for school districts), assets (assessed value), and past history (property tax received in a base year.) Since the point was to devise formulas that would closely replicate the historical pattern of changes in property tax allocation, the method of testing (reproduced in the report) compared results of the formula with historical results. An actual community, Santa Clara County, was selected to examine how various formulas would affect property tax revenue distribution. Though no final formula is recommended, the report suggests use of present distribution as a base with provision for annual changes dependent on variations of a small number of simple, clear factors. Methodology, the mathematical formulas, and charts are provided.

PB80-172992 PC **A04**/MF **A01**
California Univ., Berkeley. Inst. of Governmental Studies.
Proposition 13, Property Transfers, and the Real Estate Markets,
Frederick Balderston, I. Michael Heyman, and Wallace F. Smith. Mar 79, 71p HUD-0000929
Grant HUD-H-2944G

California's Proposition 13 reduced real estate taxes, removed the school tax from the property tax base, limited increases in assessments to 2 percent a year, and provided for reassessment only at time of sale. The law has benefited renters, many of whom received immediate rent reductions. However, its effect on the real estate market is uncertain. In theory, the reassessment provision should inhibit the mobility of home owners. However, realtors, mortgage brokers, and builders believe that the law has not affected the housing market. A study in Alameda County found that, cross - sectionally over census tracts, the turnover rate was not significantly influenced by common socioeconomic variables and that the best predictor of turnover rate is the average turnover rate. The experts feel that the threat of reassessment will not deter sellers from selling nor buyers from buying. However, reassessment may have a significant impact on nonresidential property transfer. Experts point out that provision of a steady 2 percent per annum increase does not reflect the realities of commercial real estate. It cannot accommodate low - cost improvements which increase rapidly in value nor can it reduce taxes if property depreciates. Experts also predict greater use of contracts of sale and unrecorded lease agreements to avoid the reassessment, unless buyers and sellers become convinced that assessors will become alert to such tactics. This report contains charts, statistics, appendices, and references.

PB80-173073 MF **A01**
United States Conference of Mayors, Washington, DC.
Economic Development: New Roles for City Government. A Guidebook for Local Government,
Gary Conley, John R. Nolon, William J. Schneider, Jan C. Shapin, and Morton S. Yulish. Sep 79, 60p HUD-0000977, HUD/PDR-484
Prepared in cooperation with National Community Development Association, Washington, DC., and Urban Land Inst., Washington, DC. Sponsored in part by Economic Development Administration, Washington, DC.
Paper copy available from the Sup. of Docs., Stock number 023-000-00542-5.

This guidebook is designed to assist local government administrators in developing and implementing a strategy for development, based on a realistic assessment of the city's economic future; in managing a vigorous campaign to develop that potential; and in marshaling the resources of the bureaucracy and private investors. Brief descriptions of how two cities developed economic strategies illustrate the range of conditions bearing on any potential development strategy and the types of strategies available. The Seattle, Wash., questionnaire, used to survey businesses that either had moved out of or into the city is included to show one method for building a data base on which to

assess a city's economic potential and then develop a strategy for realizing this potential. Similarly, Article 27 of the Fremont, Calif., Developmental Regulations is reprinted as an example of one city's effort to expedite building applications for development by requiring that they be approved by only one body, the Development Organization. The role of mayors in local development, as well as the mayor's relationships with developers, is discussed. Also, methods of dealing with existing businesses and of organizing to carry out economic development are described. Cities must ensure the cooperation of key actors in the local economy (i.e., bankers, industrialists, politicians, labor leaders), adopt a businesslike approach, maintain flexibility, assume risk, remain accountable to the public and the press, and maintain a bipartisan political posture. Resource materials are included.

PB80-173081 MF **A01**
United States Conference of Mayors, Washington, DC.
Local Economic Development Tools and Techniques. A Guidebook for Local Government,
J. Thomas Black, Fran Rothstein, Allan Borut, Libby Howland, and Robert Byrne. Sep 79, 83p HUD-0000978, HUD/PDR-483
Prepared in cooperation with National Community Development Association, Washington, DC., and Urban Land Inst., Washington, DC. Sponsored in part by Economic Development Administration, Washington, DC.
Paper copy available from the Sup. of Docs., Stock number 023-000-00541-7.

For local government officials, this guidebook discusses the tools and techniques that might be used to work with the private sector in carrying out a local economic development strategy. Examples of programs in Philadelphia, Pa.; Dayton, Ohio; and Baltimore, Md., illustrate how marketing, financing, zoning, taxing, and other local government actions can be coordinated with HUD, the Economic Development Administration, or local programs to achieve economic development objectives. The various tools and techniques in use in these three cities are described, with attention to their strengths and weaknesses. They include location marketing and marketing support, development financing, land assembly and improvement, zoning and permit facilitation, local tax incentives, project planning, leasing public space and facilities, and public service provision. Additional tools which may be applicable touch on public leasing and lease commitments, transportation facilities, convention / arena facilities, parking facilities, port facilities and waterfront development, and special financing mechanisms (tax increment financing and special taxing districts). In addition, an overview of Federal and State economic development programs acquaints the local government official with the array of available programs. Special considerations concerning the retention of the city's existing economic base are discussed as are reasons for outmigration of businesses and the groundrules for a retention strategy. Resource materials are included.

PB80-173099 MF **A01**
United States Conference of Mayors, Washington, DC.
Private Economic Development Process. A Guidebook for Local Government,
Allan Borut. Sep 79, 33p HUD-0000979, HUD/PDR-482
Prepared in cooperation with National Community Development Association, Washington, DC., and Urban Land Inst., Washington, DC. Sponsored in part by Economic Development Administration, Washington, DC.
Paper copy available from the Sup. of Docs., Stock number 023-000-00540-9.

In planning and implementing a local economic development strategy, local government officials can use this guidebook to discover how private investors and developers make decisions, how local governments can help or hinder the private sector, and how local officials can attract qualified developers to assist in strengthening the local employment and tax base. Some key concepts in the development process involve different ways of realizing a return on investment: profit arising from the sale of a property where price exceeds costs, actual cash flow generated by the operation of properties owned and managed by the developer, fees earned for organizing and managing development for others, syndication fees earned through the sale of equity shares to limited partners, and tax losses assignable to other income which can be used to reduce personal income. Characteristics of private development projects emphasize the situations developers find attractive, major actors in the development process (private developers, lenders, equity investors, professionals, contractors, local public officials, citizen groups, and the Federal Government), and ingredients which make a project successful. Finally, a step - by - step examination of a specific development project outlines the following eight steps in the development process: market analysis; project identification; site acquisition; project negotiation; planning, design, and engineering; financing; construction; and marketing. An appendix contains an analysis of the potential economic development benefits. No references are provided.

PB80-173206 PC **A04**/MF **A01**
RAND Corp., Santa Monica, CA.
How Housing Allowances Affect Housing Prices. Housing Assistance Supply Experiment,
C. Lance Barnett, and Ira S. Lowry. Sep 79, 52p HUD-0001049
Contract HUD-H-1789

Experimental evidence from the full - scale housing allowance programs conducted in Brown County, Wis., (an unsegregated market with a low vacancy rate) and St. Joseph County, Inc., (a segregated market with a high vacancy rate) make up this report on how the Housing Assistance Supply Experiment is affecting housing prices. The records of the first several years of program operations and of systematic annual surveys of the rental markets in the sites reveal no significant price increases beyond those clearly attributable to national price inflation -- especially rising energy prices. Those who expected substantial price effects generally assumed faster program growth, more elastic housing demand by participants, stronger earmarking effects, and less elastic supply than was encountered in the field. The evidence concerning market stimulus, market effects, gross and contract rent increases, components of gross rent increases, contract rent changes for participants, gross rent changes in submarkets, local versus national and regional rent inflation, and rent increases for stayers and movers presented in this report leads to the conclusion that housing allowances can be judged in terms of who participates, how much they benefit, and the costs of the program relative to alternatives; nonparticipants can be assumed to be unaffected by the program. Reasons why price effects have been small are discussed in detail; they include slow and gradual enrollment, small increments provided participants, high rates of choices to repair housing rather than move, and demand shift and rent change not sensitive to these shifts. Study data and references are provided. (Author abstract modified).

PB80-173297 PC **A04**/MF **A01**
RAND Corp., Santa Monica, CA.
Shortrun Response of Housing Markets to Demand Shifts. Housing Assistance Supply Experiment,
C. Peter Rydell. Sep 79, 51p HUD-0001080
Contract HUD-H-1789

This report draws on research concerning housing market response to demand shifts conducted as part of the HUD - sponsored Housing Assistance Supply Experiment (HASE), part of HUD's Experimental Housing Allowance Program. The monopolistic competition theory of housing market behavior, when applied to HASE using experimental data to estimate the parameters, predicted that introduction of a housing program would cause shortrun rent increases of only 0.6 percent and capital value increases of 1.6 to 6.5 percent. The analysis was limited to a high (0.5) income elasticity of demand and to rental housing. These theoretical limitations reinforced the conclusion that a housing allowance program does not cause rent increases that are relevant to housing policy. The theory also explains why vacancies exist and why rents change less than capital values as a consequence of demand shifts. Thus, application of the theory to HASE shows that the allowance program has not perceptibly increased rents, since vacancy rates at baseline were large enough to absorb most of the small demand shift. Further research is needed to examine the relationship between occupancy rates and rents using additional data, and to extend the theory by analyzing supply adjustment to longrun equilibrium. Four technical appendices and references are included. (Author abstract modified).

PB80-177231 PC **A05**/MF **A01**
East Tennessee Development District, Knoxville.
Public Facility and Service Needs Around the Big South Fork National River and Recreation Area (Tennessee/Kentucky).
Final rept.
May 80, 90p EDA-80-062
Grant EDA-04-06-01736
Prepared in cooperation with Upper Cumberland Development District, Cookeville, TN.

The report presents the results of the first year of the Tennessee portion of the planning program and includes a description of existing public facilities and services in the area and a preliminary listing of needed projects to accommodate the Big South Fork. Among the local needs of the BSF are several major road improvements; expansion of a landfill in at least one county to accept increased solid waste generation; additional law enforcement to deal with traffic control; additional ambulance and hospital emergency staff; and various expansions and extensions of water and wastewater systems to serve increased population and new tourist oriented development.

PB80-177652 PC **A10**/MF **A01**
Kentucky Univ., Lexington. Center for Business Development.
University of Kentucky Regional Economic Development and Technical Assistance Program. Management Assistance to Business.
Final rept. 31 Jul 78-31 Jul 79.
Mar 80, 220p EDA-80-063
Grant EDA-04-06-01565-1

The objective of the program is to aid in the economic development of the state of Kentucky by providing managerial and technical counseling to small businesses, local community groups, or local governments in their operation of public works projects or in the development of new industrial ventures. The program provides assistance to applicants for Federal aid, especially client firms, and compiles economic and technical studies related to the overall development in the State.

PB80-178239 PC **A03**/MF **A01**
California Univ., Irvine. Public Policy Research Organization.
Research on Proposition 13: Report from Two Workshops,
J. N. Danziger, and J. Margolis. 1979, 39p NSF/RA-790409
Grant NSF-DAR78-24567
Prepared in cooperation with California Univ., Berkeley. School of Social Sciences.

Representatives of the social science research community discuss the research areas and the research frameworks that might be most valuable in analyzing the fiscal limitations movement with primary attention to California's Proposition 13. The report calls for investigation of the overall impact of California's revenue collection system on the voting population, organizational consequences of Proposition 13, and the social basis of anti-tax and anti-government sentiment. It lists four potential kinds of change that require analysis and raises questions concerning the economic impact of Proposition 13 on the private sector. It presents a national and international perspective on trends in fiscal limitations measures.

PB80-179013 MF **A01**
Department of Commerce, Washington, DC.
Business America - The Journal of International Trade. Volume 3, Number 10, May 19, 1980.
Bi-weekly pub.
19 May 80, 49p
See also Volume 3, Number 8, PB80-169253.
Paper copy available from Supt. of Docs.

Contents:

Nation observes World Trade Week 1980;
Near East nations set development priorities;
Washington trade briefs;
Romania strengthens commercial ties with U.S.;
Economic highlights;
Business outlook abroad;
Worldwide business opportunities.

PB80-179021 PC **A10**/MF **A01**
Northwest Iowa Regional Council of Governments, Spencer.
A Suggested Economic Adjustment Strategy and Economic Development Program for Northwest Iowa.
Final rept.
Mar 80, 213p EDA-80-070
Grant EDA-05-06-01828-40

The purpose of the enclosed work plan is to describe an expanded economic development program and economic adjustment strategy for Northwest Iowa. This program is very important to Northwest Iowa because the Region is characterized by a growth rate in population and jobs substantially below that of the State and the U.S. The research has clearly indicated that Northwest Iowa is relatively well-endowed in terms of the facilities and resources needed to support industry, location in regard to markets and supplies, and a number of other attributes.

PB80-179237 PC **A02**/MF **A01**
New Jersey Economic Development Authority, Trenton.
New Jersey Trade Adjustment Assistance Center, Annual Report, September 15, 1978-September 14, 1979.
1979, 18p EDA-80-066
Grant EDA-99-26-09850-10

The Center's primary function is to provide financial assistance to New Jersey companies in order to create a more productive labor force. The report summarizes and evaluates the Center's first year activities and outlines future program activities.

PB80-180821 PC **A04**/MF **A01**
Hickok (Eugene A.) and Associates, Wayzata, MS.
Feasibility Study: Cement Production, State of Minnesota.
Dec 79, 72p EDA-80-064
Grant EDA-06-06-01562.40

Shortages of Portland cement arose in the southwestern United States in 1977 and spread throughout the Midwest, affecting much of the nation in 1978. Shortages were experienced in Minnesota, which wholly relies on outside cement production. Objectives of the study include locating potential sites for cement production facilities and providing engineering estimates of costs and preliminary selling price.

PB80-180862 PC **A06**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Natural Resource Economics Div.
Landownership in the United States, 1978.
Agriculture information bulletin,
James A. Lewis. Apr 80, 104p AIB-435

Farmers are only 8 percent of all owners of private U.S. land, but they own 46 percent of it, the largest share of any group. White-collar and blue-collar workers are a majority of owners, at 52 percent, but own only a quarter of the private land. Retired persons (21 percent of all owners) own about 17 percent. Family units own most of the private land; nonfamily units (estates, partnerships, corporations), representing 6 percent of all owners, own 18 percent of the land. Federal, State, and local governments own about 40 percent of the total 2.3 billion acres in the United States.

PB80-181001 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
The Economics of Consumer Product Information.
Final rept.,
Rachel Dardis. May 80, 55p NBSIR-80-2016

The major objective of this study was to examine the economic principles underlying the provision and acquisition of consumer product information. The direct and indirect benefits from product information and the economics of consumer information acquisition comprise the first part of the study. The existence of the consumer information gap within the past two decades is investigated in the second part of the study. Reasons for information failures in the marketplace are then examined leading to a dicussion of various methods for increasing the level of consumer product information. The analysis should provide an understanding of reasons for information failures in the marketplace and problems faced by policy makers in attempting to correct market deficiencies.

PB80-181183 PC **A03**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Economic Development Div.
Relationships Between Size of Schools and School Districts and the Cost of Education.
Technical bulletin,
William F. Fox. Apr 80, 30p TB-1621

More than 30 studies of size of economies in the production of local education services are reviewed in terms of their theoretical basis, methodological approach, data, results, and possible applications. The consistency of the reported results suggests with certain qualifications that increased size of elementary and secondary schools will permit some limited economies. Economies will also result when more students are administered by the same school district. Care must be taken in applying these results because the degree of savings also depends on other factors, such as quality of education provided and transportation costs.

PB80-181241 PC **A04**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. National Economics Div.
Agricultural Finance Review, Volume 40,
David Lins, and Dean Hughes. Apr 80, 66p AFR-40
See also Volume 39, PB80-116882.

The articles report on concepts and research in a broad range of agricultural finance issues that relate to farm and rural finance; financial management and firm growth strategies; insurance; income; farm supplies, processing, and distribution industries; financial institutions; taxation; rural economic development; and the organization of agricultural production.

PB80-182025 PC **A05**/MF **A01**
Guam Governor, Agana.
Slaughterhouse Feasibility Study, Agana, Guam,
Samuel A. Lee, and Jack T. Ishida. Apr 80, 94p EDA-80-065
Grant EDA-07-06-02027
Prepared in cooperation with Hawaii Univ., Honolulu.

The study examines the feasibility of constructing a commercially viable and efficiently managed USDA-approved slaughterhouse on Guam. The report provides an economic analysis of the Guam hog industry and lists the construction, maintenance, operations, and cash flow requirements for the slaughterhouse. An environmental impact assessment is included.

PB80-182041 CP **T03**
Federal Communications Commission, Washington, DC. Computer Applications Div.
Common Carrier Statistics.
Data file,
John Guili. 1978, mag tape FCC/DF-80/006
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

This is a print tape of the 1978 edition of the 'Statistics of Communications Common Carrier' compiled by the Common Carrier Bureau of the FCC. This issue contains financial and operating data for the year 1978. This information was taken principally from annual and monthly reports filed by the Carrier with the Federal Communications Commission.

PB80-182371 PC **A02**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
Local and Regional Environmental Loading: An Ecological Assessment (ECA) Tax as a Substitute for the Local Property Tax,
Thomas C. Edens. Aug 75, 17p DMRE-76-1, NSF/RA/E-75/382
Grant NSF-GI-20

The paper discusses the conceptual development and implementation plan for an ecological assessment (ECA) tax designed to improve allocation and utilization of natural resources. The ECA tax would be determined on the basis of unique ecological characteristics of an area, homogeneous areas being identified within a discrete political unit. A step-wise adjustment procedure to implement the ECA tax is described and illustrated. The ECA tax is envisioned as a substitute for property taxes at the local level while maintaining many elements of existing property taxes. Components of use ratio estimates are listed together with suggested tax credits. The ECA tax scheme has the advantage of regional and local specificity. Since it is a replacement for an existing tax, ECA probably would encounter less public opposition than implementation of a new scheme.

see individual report for order number and price
International Customs Tariffs Bureau, Brussels (Belgium).
International Customs Journal. Year 1979-1980.
Bulletins.
1979-80,open series
See also 14th Edition, Supplement 1, PB80-112600.

The reports present authoritative information for exporters, importers, investors, manufacturers, and those concerned with international trade. They contain the schedules of customs duties and exemptions applicable to goods imported into or exported from the country. Other individual documents are also available:

BULL-24. Spain. 14th ed, suppl-2, Feb 80, 91p, suppl. to PB80-112600, PC A05, MF A01 **PB80-183007**
BULL-89. Tunisia. 8th ed, Mar 80, 163p PC A08, MF A01 **PB80-184906**
BULL-13. China (People's Republic of). 1st ed, Mar 80, 67p, PC A04, MF A01 **PB80-185580**
BULL-89. Republica Tunecina. 8th ed, Mar 80, 161p, PC A08, MF A01 **PB80-185598**

PB80-186075 PC **A02**/MF **A01**
International Customs Tariffs Bureau, Brussels (Belgium).
Syrian Arab Republic: International Customs Journal. 4th Edition, Supplement 2, Year 1979-1980.
Bulletins.
Oct 79, 13p BULL-50-SUPPL-2
See also Supplement 1, PB-299 394.

The report presents authoritative information for exporters, importers, investors, manufacturers, and those concerned with international trade. They contain the schedules of customs duties and exemptions applicable to goods imported into or exported from the country.

PB80-189855 PC **A06**/MF **A01**
Heritage, Conservation and Recreation Service, Washington, DC.
Federal Tax Provisions to Encourage Rehabilitation of Historic Buildings: An Assessment of Their Effect,
Sally G. Oldham, and H. Ward Jandl. Aug 79, 102p HUD-0001266

Based upon a survey of present and potential beneficiaries of Federal tax provisions to encourage rehabilitation of historic buildings, the Heritage Conservation and Recreation Service (HCRS) reports on experiences with administering the certification process by which buildings qualifying for the tax incentives are determined. Current program statistics and questionnaire results show strong signs that the incentives contained in the Tax Reform Act are making a positive impact on the

revitalization of cities and towns, as an increasing number of property owners and qualified lessees become familiar with preservation provisions.

PB80-190044 PC **A06**/MF **A01**
Council of State Planning Agencies, Washington, DC.
Development Politics: Private Development and the Public Interest.
Studies in State Development Policy rept. no. 8 (Final),
Robert Hollister, and Tunney Lee. c1979, 102p
EDA-ERD-80-150
Grants EDA/OER-553-G-78-21, EDA-99-7-13360-1

The publication reviews recent experience with 'front end' approaches to assessing the impacts of large scale development projects. Its objective is to clarify the advantages and disadvantages of this way of handling impact assessment--that is, of structuring assessment to occur at the same time as, rather than after, development planning. The report is organized around two major projects that illustrate the recent impact assessment experiences of state planners. The Massachusetts example describes the planning process for a major mixed-use development, Copley Place, in central Boston, at a location adjoining both poor and wealthy neighborhoods. The Wisconsin example illustrates a very different situation--a major copper and zinc mining operation (Crandon Project) being planned by Exxon in a rural area with high unemployment.

PB80-810872 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electronic Funds Transfer. 1964-May, 1980 (Citations from the NTIS Data Base).
1964-May 80,
William E. Reed. Jun 80, 87p
Supersedes NTIS/PS-79/0595 and NTIS/PS-78/0347.

Federally-sponsored research reports are cited which relate to the electronic transfer of funds. Topics included are regulation, economic factors, role of Government, effects on monetary policy, industrial impact, legal rights, point of sale systems, branch/terminal issues, and consumer issues of privacy security, liability, and documentation. (This updated bibliography contains 80 abstracts, 2 of which are new entries to the previous edition.)

PB80-811110 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Small Business: Management, Economic Development, and Government Policies. 1964-March, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Mar 80,
Jack E. Jones. Jun 80, 167p

The bibliography cites reports that focus on small businesses. Reports discussing management practices and techniques for small businesses are cited. Economic studies describing the development of the small business community are included. Reports on government policies such as regulations, financial assistance, and technical assistance programs are cited. Excluded are reports strictly dealing with minority enterprises. (Contains 160 abstracts)

5D. History, Law, and Political Science

PB80-173008 PC **A09**/MF **A01**
California Univ., Berkeley. Inst. of Governmental Studies.
Limiting State Spending: The Legislature or the Electorate,
Frank M. Bowen, and Eugene C. Lee. Mar 79, 177p HUD-0000930
Grant HUD-H-2944G

This descriptive survey compares 12 measures to limit the spending authority of State governments: Propositions 1 and 13 in California; laws adopted in New Jersey in 1976 and Colorado in 1977; constitutional limitations that were adopted in 1978 in Tennessee, Arizona, Hawaii, and Texas; Michigan's slightly different constitutional limitation which places spending levels in the hands of the electorate; and three constitutional proposals before State legislatures in 1978. Of these last three, two (in California and Maine) were defeated, and one (in Massachusetts) is still pending. The survey covers the years selected as a base for the limitations, technical factors and adjustments in the proposals, exemptions and exclusions from limitations, provisions for emergencies, and provisions for surpluses, refunds, and reserves. Many of these laws and constitutional amendments also limit local fiscal authority. The interplay between local and State limitations is examined. An analysis of these limitations shows that new philosophies of public finance are emerging and that existing analytical tools do not fit these changes. The public distrust of elected officials, the taxpayers' revolt against piecemeal spending, and the blur between constitutional and statutory limitations all demonstrate that public finance is entering a new era and must develop new approaches. This heavily documented study contains references and appendices.

PB80-173339 PC **A03**/MF **A01**
American Bar Association, Washington, DC. Special Committee on Housing and Urban Development Law.
Housing Justice in Small Claims Courts.
Executive summary,
John C. Ruhnka, and Randall W. Scott. 1979, 33p HUD-0001087
Contract HUD-H-2856

Data for this study involved the examination of 15 small claims courts in various parts of the country, selected to include examples of all major small claims procedural variations including limits on access to small claims courts, prohibition or permission of attorneys at small claims trials, the use of filing limits on small claims, and various degrees of court - provided assistance to litigants. The option of a hearing before a lawyer - arbitrator instead of trial before a judge was discussed, as was the use of lawyer - referees instead of judges, and limitations on transfer and appeal. In each court, 500 caseloads were randomly selected for analysis from the last half of the 1975 caseload of each court, for a total of 7,500 cases. Replies to questionnaires sent to each plaintiff and defendant yielded 2,039 responses. The 5 major categories of small claims subject matter examined by the 15 courts included landlord - tenant disputes (12 percent), consumer plaintiff, seller plaintiff, property damage, and other. A detailed analysis of outcomes in landlord - tenant cases used two primary measures: victory rates and awards as a percentage of claim. Several recommendations were given to help avoid unnecessary landlord - tenant disputes and to reduce existing tenant and landlord problems with the small claims process. Legal misconceptions of the respective rights of landlord and tenant must be reduced and the development of standard lease forms, approved as to clarity, format, content, and comprehensiveness, would be one step in this direction. Other changes in leasing and rental property management approaches include walk - through inspections and signed checklists of problems existing in an apartment, both at inception and termination of the lease; readable additional material on special issues (such as security deposits and maintenance for tenants); and a mutually agreed - upon method to notify the landlord of the intent to terminate the lease. Small claims courts also need to experiment with providing pretrial / in - court counseling, mediation, or arbitration resources.

PB80-179664 PC **A02**/MF **A01**
Washington State Office of the Administrator for the Courts, Olympia.
Special Adjudication for Enforcement (SAFE). Executive Summary.
Annual rept. (Final), Sep 77-Mar 79,
Mar 79, 18p DOT-HS-805 304
Contract DOT-HS-343-3-682
See also Volume 1, PB80-179872. Report on King County District Courts.
Also available as set of 3 reports PC E08, PB80-179856.

The Special Adjudication for Enforcement (SAFE) Project was designed to demonstrate the feasibility of using informal parajudicial hearings for adjudication of non-mandatory moving traffic violations (those offenses not requiring mandatory appearance in court). The SAFE procedures were intended to simplify the administrative tasks associated with the traditional arraignment/trial process. Evaluation based on fifteen months of operations has indicated that the project was easily and quickly incorporated into the existing District Courts system and reduced the administrative and judicial burden on the courts. The SAFE Project was continued with local funds after the NHTSA demonstration project was concluded.

PB80-179872 PC **A05**/MF **A01**
Washington State Office of the Administrator for the Courts, Olympia.
Special Adjudication for Enforcement (SAFE). Volume I.
Annual rept. (Final), Sep 77-Mar 79,
Douglas Arnold, and Dan Fleissner. Mar 79, 97p DOT-HS-805 305
Contract DOT-HS-343-3-682
See also Executive Summary, PB80-179864 and Volume 2, PB80-179880. Report on King County District Courts.
Also available in set of 3 reports PC E08, PB80-179856.

The King County District Courts Special Adjudication for Enforcement (SAFE) Project was designed to demonstrate the feasibility of using informal parajudicial hearings for adjudication of non-mandatory moving traffic violations (those offenses not requiring mandatory appearance in court based on the seriousness). The SAFE procedures, which are now integrated into District Court operations, were intended to simplify the administrative tasks associated with the traditional arraignment/trial process and eliminate one required personal appearance of persons wishing to contest their charges. Informal hearings, in which defendants can explain their side of the matter, are conducted by magistrates (practicing attorneys). Magistrates can accept guilty pleas, reduce and/or suspend fines, and, in extreme situations, dismiss cases. If the defendant is adamant about his/her not guilty plea, a trial is set (bypassing the formal arraignment). The program emphasizes referrals to driver educational programs and is oriented toward driver improvement. The use of SAFE hearings and procedures during the demonstration period allowed the District Courts system to deal with an increasing number of traffic filings without a significant increase in staff, and is projected to result in reductions of approximately 34,000 arraignments and 7,000 trials in 1979.

PB80-179880 PC **A06**/MF **A01**
Washington State Office of the Administrator for the Courts, Olympia.
Special Adjudication for Enforcement (SAFE). Volume II.
Annual rept. (Final), Sep 77-Mar 79,
Douglas Arnold, and Dan Fleissner. Mar 79, 118p DOT-HS-805 306
Contract DOT-HS-343-3-682
See also Volume 1, PB80-179872 and PB80-102106. Report on King County District Courts.
Also available as set of 3 reports PC E08, PB80-179856.

The Special Adjudication for Enforcement (SAFE) Project was a demonstration project for an innovative parajudicial method of adjudication for minor traffic offenses. The SAFE Project was conducted for an 18-month period and operated as a subsystem of normal District Court operations within the King County (Seattle, Washington) area. The purpose of the project was to reduce the backlog of minor traffic cases (moving forfeitable), which accounted for approximately 65 to 70 percent of the courts' overall filings (total traffic filings accounted for approximately 77 percent of the courts' overall filings), and to provide an alternative to the time-consuming arraignment/trial process for those defendants wishing to contest their traffic violations. The SAFE Project was intended to test the feasibility of integrating the SAFE magistrates and streamlined procedures into normal court operations and to determine the cost effectiveness, overall acceptance of the program by law enforcement and judicial personnel, and benefits and convenience to the public.

PB80-181365 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC.

A Study of Handcuff Improvements.
James E. Harris. Apr 80, 26p NBSIR-80-1989
Sponsored in part by National Inst. of Justice, Washington, DC.

Designs for improving the security of present day ratchet and pawl metallic handcuffs are presented. Two methods utilizing a new lock feature were developed that significantly improve the lock. In addition, several other potential handcuff improvements are discussed in this report.

5F. Humanities

AD-A083 997/7 PC **A06**/MF **A01**
Corps of Engineers Huntington WV Huntington District
Ohio River Environmental Assessment: Cultural Resources Reconnaissance Report, West Virginia.
Aug 77, 122p

The goal of this study was to prepare a systematic listing of information on known cultural resources in the Ohio Valley of West Virginia. This data will be used to evaluate the effects of continued operation of the Ohio River Navigation System on cultural resources. The data will also be used for planning purposes such as preparing master plan updates and updating the inventories of cultural resources on Corps owned and Corps controlled lands on the Ohio River. For the purposes of this report, cultural resources have been divided into prehistoric and historic. Prehistoric resources include mounds, camps, villages and other habitation loci of native populations prior to 1750 A.D. Historic resources post-date the beginning of the Colonial period in the Ohio Valley and include sites of historic structures, districts, and historic archaeological sites. Together these resources contain the unwritten documents of mankind's cultural achievements in technology, economy, esthetics, domestic and public architecture, as well as the data base for understanding cultural continuties and changes. This report is based on a literature and records search and does not pretend to be comprehensive in its scope or findings. The report was written at the reconnaissance level of investigation and was designed to provide a framework for future cultural resource surveys undertaken in the Ohio Valley.

AD-A084 040/5 PC **A08**/MF **A01**
Indiana Univ At Bloomington Glenn A Black Lab of Archaeology
Cultural Resources of the Ohio River Valley in Indiana,
Cheryl Ann Munson, William F. Limp, David F. Barton, and James H. Kellar. Jul 77, 170p
Contract DACW69-77-M-0722

The goal of this study was to prepare a listing of information on known cultural resources in the study area in a systematic format. From this base and from other studies in adjacent portions of the Ohio Valley a generalized assessment of these resources can be drawn and appropriate plans can be made to conserve and protect them. Published and unpublished documents, records, maps, and knowledgeable individuals were consulted for information. For the purposes of this study, cultural resources have been divided into two categories: historic and prehistoric. Historic resources postdate the beginning of the Colonial period and predate the modern era or AD 1900 in the Ohio Valley; these include sites of historic structures, districts, and abandoned towns or historical archaeological sites. Prehistoric resources include mounds, earthworks, camps, villages, or other habitation loci of the prehistoric period, prior to AD 1700. Together these known resources contain the unwritten documents of humankind's cultural achievements in technology, economy, esthetics, domestics, public, and religious architecture, as well as the data base for understanding cultural changes and continuities.

PB80-177918 PC **A04**/MF **A01**
Nebraska Univ., Lincoln. Div. of Archeological Research.
An Appraisal of Cultural and Paleontological Resources within Sections 1 and 2 of the Proposed Mirdan Canal Project, Garfield and Valley Counties, Nebraska. Volume I.
Final rept. Jun 78-Feb 80,
N. Steven King, and Robert E. Pepperl. Feb 80, 67p TR-80-03
Sponsored in part by Water and Power Resources Service, Denver, CO.

A study conducted to locate and evaluate cultural resources within Sections 1 and 2 of the proposed Mirdan Canal project was initiated under two contractual agreements between the University of Nebraska and the Water and Power Resources Service during the summer of 1978. A thorough search of literature and records relevant to the project area has been completed. An intensive (100% coverage) pedestrian survey of all accessible project lands resulted in the identification of 31 locations of contemporary and early twentieth century material. No paleontological or prehistoric Native American sites or materials were located. Based on the results of this study, further investigations prior to the proposed construction of Sections 1 and 2 of the Mirdan Canal project are not recommended. However, it is suggested that construction crews be made aware of the potential for encountering buried cultural resources and that professional archeologists/paleontologists be contacted should this occur.

5G. Linguistics

AD-A083 923/3 PC **A04**/MF **A01**
Naval Ocean Systems Center San Diego CA
Natural Language Processing Applied to Navy Tactical Messages.
Technical document,
David M. Keirsey. 1 Feb 80, 62p Rept no. NOSC/TD-324

Natural Language Processing (NLP) was investigated as a possible solution to the problem of automating the fusion of multisource data, and it was found that if there is a solution to the problem of timely use of text-like data in the Naval tactical message, then that solution is NLP. However, major modifications to the 'human' side of the process are needed; for example, uniform usage of abbreviations and acronyms. Tactical messages are analyzed. The problems are addresed in terms of NLP techniques. The relevant NLP techniques are described. Sample 'knowledge representations' are proposed. It is concluded that NLP is an infant technology, and technology transfer from NLP and related efforts elsewhere will be difficult. Great care is needed in developing a usable, working system. Care in specifying exactly the capabilities and deficiencies of the system is important. (Author)

5H. Man-Machine Relations

AD-A083 720/3 MF **A01**
Ketron Inc Wayne PA
Hazards/Failure Modes and Effects Analysis MK 1 MOD 0 LSO-HUD Console System.
Final rept.,
Francis Sevcik, Gerald S. Farber, and William S. Mann. 24 Mar 80, 283p KTM-1327-01, NAEC-91-7958
Contract N68335-78-C-2002
Availability: Microfiche copies only.

The MK 1 MOD 0 LSO-HUD Console System provides aircraft recovery information to the Landing Signal Officer aboard aircraft carriers. This analysis identifies individual failure modes of the LSO-HUD Console System and assesses hazard level and probability of occurrence of these modes. Design recommendations are included. (Author)

N80-22705/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Algorithm for the Stabilization of Motion a Bounding Vehicle in the Flight Phase.
V. V. Lapshin. Jan 80, 39p NASA-TM-75695, PREPRINT-50
Contract NASW-3199
Transl. Into English of "Algoritm Stabilizatsii Dvizheniya Prygayushchego Apparatav Faze Poleta" Preprint-50, Acad. Of Sci. USSR, Inst. Of Applied Math. Imeni M. V. Keldysh, Moscow, 1979 p 1-63. Translation Was Announced as N80-10497. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

The unsupported phase of motion of a multileg bounding vehicle is examined. An algorithm for stabilization of the angular motion of the vehicle housing by change of the motion of the legs during flight is constructed. The results of mathematical modelling of the stabilization process by computer are presented.

N80-23005/5 PC **A03**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (Germany, F.R.). Inst. fuer Flugfuehrung.
A Method for Semi-Automatic Analysis of Eye Movements.
H. Radke. Dec 78, 33p DFVLR-MITT-79-02
Text in German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-475).

The measurement and analysis of the operator's visual behavior is described in terms of its importance as a tool for human factor research on the layout of displays and controls. However, the analysis of eye-point-of-regard data is difficult and time consuming. A semi-automatic computer aided procedure is described, which reduces the time needed for data analysis.

5I. Personnel Selection, Training, and Evaluation

AD-A083 678/3 PC **A07**/MF **A01**
Navy Personnel Research and Development Center San Diego CA
The Instructional Quality Inventory. II. User's Manual.
Special rept.,
John A. Ellis, Wallace H. Wulfeck, II , and Patricia S. Fredericks. Aug 79, 136p Rept no. NPRDC-SR-79-24
See also Part 1, AD-A062 493.

Instructional System Development (ISD), a systematic method for developing military instruction, is used by the military services to develop or revise a large portion of the training courses. The Instructional Quality Inventory (IQI) was developed to provide quality control/evaluation procedures for ISD. This report provides complete documentation for all the IQI procedures. (Author)

AD-A083 688/2 PC **A03**/MF **A01**
George Washington Univ Washington DC Program in Logistics
Applications of a Wage-Turnover Model to the Shipbuilding Industry.
Scientific rept.,
Sheldon E. Haber, and Enrique J. Lamas. 8 Feb 80, 29p Rept no. SERIAL-T-414
Contract N00014-75-C-0729

The object of this paper is to indicate how a model of firm behavior, which incorporates training costs and turnover, can be utilized to answer important decisions relating to hiring and retention. The basic model is adopted from the extant literature and extended in this paper. While the impetus for the paper arises out of research into the shipbuilding labor market, the applications discussed are of general interest to any firm regardless of industry. (Author)

AD-A083 712/0 PC **A08**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
An Investigation of the Factors which Affect the Career Selection Process of Air Force Systems Command Company Grade Officers.
Master's thesis,
Richard J. Mosbach, and Thomas J. Scanlan. Dec 79, 164p Rept no. AFIT/GSM/SM/79D-19

The general purpose of this study was to identify and analyze the individual perceptions and attitudes which affect the career selection decision of Air Force Systems Command company grade officers. This research included a literature review of recent work in the area of career turnover. The review identified two major theoretical developments which were postulated to add significant predictive power to Lewis' approach: (1) the effect of a person's motivation to comply with the expectations of others and (2) the effect of a person's current job satisfaction. The purpose was to opera-

tionalize the aforementioned concepts in a single model which explained the most variance in individual career intentions. A survey was completed by 2200 company grade officers throughout Systems Command. The results of the data analyses showed that a model which addressed not only the perceived attraction of job alternatives, but also the effects of the expectations of others, and current job satisfaction more accurately described an individual's career selection decision.

AD-A083 716/1 PC **A06**/MF **A01**
Clemson Univ SC
Requirements for Information/Education Programs on Hypothermia.
Final rept. 1 Dec 78-27 Aug 79,
Margaret C. Pridgen, and R. Michael Harnett. 23 Oct 79, 117p USCG-D-13-80
Contract DOT-CG-72074-A

This report describes requirements for three information/education programs aimed at recreational boaters, commercial seamen (merchant mariners and commercial fishermen) and Coast Guard personnel. The requirements specify program content and recommend modes of delivery for programs intended to reduce the occurrence of hypothermia-related fatalities by improving: hazard recognition, knowledge of self-aid techniques, knowledge of first-aid procedures, and knowledge of self-aid methods. Modular programs are defined which offer flexibility for implementation consistent with budgetary considerations. (Author)

AD-A083 731/0 PC **A05**/MF **A01**
Arizona Univ Tucson Dept of Educational Psychology
A Structural Approach to the Validation of Hierarchical Training Sequences. Task 1. Technical Report,
John R. Bergan, Anthony A. Cancelli, and Olga Towstopiat. 1978, 87p
Contract MDA903-79-C-0192, ARPA Order-3699

This project is aimed at developing the technology necessary to conduct cost effective and efficient validations of the sequencing of instruction used in the training of military occupational specialties. The specific objective covered by this technical report was to validate task domains indicating how tasks are grouped into skill classes. A total of 317 subjects were tested on four algebra skill domains constructed from the Precision Measuring Equipment Curriculum of the Air Force Advanced Instructional System. Latent structure techniques recently developed by Leo Goodman at the University of Chicago were used to validate the hypothesized domains. The first step in the analysis was to construct a set of models representing hypotheses about the tasks under examination. The models developed for use in the present analysis assumed three basic classes of individuals for tasks in an hypothesized domain. These classes included masters of the skill represented in the domain, non-masters, and individuals in transition between non-mastery and mastery. Non-masters were characterized as failing all items in the domain, and masters as passing all items.

AD-A083 732/8 PC **A04**/MF **A01**
Arizona Univ Tucson
A Structural Approach to the Validation of Hierarchical Training Sequences.
Technical rept.,
John R. Bergan, Anthony A. Cancelli, and Olga Towstopiat. 1979, 60p Rept no. TR-2
Contract MDA903-79-C-0192, ARPA Order-3699

This report describes developing the technology necessary to conduct cost effective and efficient validations of the sequencing of instruction used in the training of military occupational specialties. The specific objective was to validate the hierarchical ordering of task domains. A total of 317 subjects were tested on two algebra skill domains. Latent structure techniques recently were used to validate the hypothesized ordering between domains. The first step in the analysis was to construct a set of models representing hypotheses about the tasks under examination. The models developed for use in the present analysis assumed three basic classes of individuals for tasks in an hypothesized domain. These classes included masters of the skill represented in the domain, non-masters, and individuals in transition between non-mastery and mastery. Non-masters were characterized as failing all items in the domain, and masters as passing all items. Transitional individuals were assumed to respond inconsistently in a manner congruent with the assumption that they were still in the process of acquiring the concept or rule underlying mastery of the tasks in the domains under examination.

AD-A083 733/6 PC **A04**/MF **A01**
Washington Univ Seattle Dept of Psychology
Generalized Expectancies, Life Experiences, and Adaptation to Marine Corps Recruit Training.
Technical rept.,
Thomas M. Cook, Raymond W. Novaco, and Irwin G. Sarason. 7 Apr 80, 58p Rept no. AR-002
Contract N00014-77-C-0700

This research studied the relationships of the training unit environment, life experiences, generalized expectancies, and personality variables to attrition and performance among Marine Corps recruits. Generalized locus of control expectancies and the training unit environment were found to play especially important roles in the success or failure of recruits. The research showed the value of an interactional view of adaptation to stress. This view emphasizes the need to investigate jointly the effects of personal and environmental factors. (Author)

AD-A083 763/3 MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
The Military Survivor Benefit Plan: How Much Does It Benefit the Retiree.
Master's thesis,
Thomas L. Wade. Dec 79, 237p Rept no. AFIT/GOR/SM/79D-9
Availability: Microfiche copies only.

This study was conducted to examine the military Survivor Benefit Plan and the extent of its costs and benefits. Currently, the participation rate in the plan is extremely low among military retirees. Past improvements to the plan have failed to increase participation. Other proposed revisions to the plan are scheduled to go before Congress; some of these proposed changes have already failed to pass Congress a number of times before. Initially, this study looks at the basic elements of the Survivor Benefit Plan. Next, methods of analyzing the plan are investigated with emphasis on the further development of an already existing computer model. Private insurance plans are then studied as possible alternatives to the Survivor Benefit Plan. As a conclusion, the Survivor Benefit Plan and insurance plans are compared and recommendations are offered. (Author)

AD-A083 781/5 PC **A09**/MF **A01**
Virginia Polytechnic Inst and State Univ Blacksburg Human Factors Lab
Automated Motor Skills Training Optimized for Individual Differences.
Interim rept. 1 Oct 78-30 Sep 79,
Beverly H. Williges, and Robert C. Williges. Nov 79, 191p VPI-HFL-79-11/AFOSR-79-1, AFOSR-TR-80-0284
Grant AFOSR-77-3161

The goal of this programmatic research effort was to investigate the ramifications of both micromodels and macromodels in individualizing motor skills training. Specifically, the research conducted during 1 October 1978 to 30 September 1979 dealt with the use of feedback in adaptive training, the extensions of regression approaches to training group assignment, and the evaluation of population differences. (Author)

AD-A083 830/0 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA
Performance in the Military of General Educational Development Certificate Personnel.
Master's thesis,
Erkut Ersoy. Dec 79, 66p

The objective of this study is to analyze adjustment to the military of a specific educational group: GED (General Educational Development) holders. This study also compares members of the GED and other educational groups on selected characteristics. Finally, this study analyzes first-term loss rates for these groups by applying a linear-group prediction model.

AD-A083 834/2 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA
Skill Development and Its Retention.
Master's thesis,
Steven B. Gibson. Dec 79, 53p

Recent popular opinion describes today's new recruit as less intelligent than those recruited before the advent of the all volunteer force (AVF). This is not the case. The status of literacy in the navy has remained almost constant with a slight improvement since the AVF. The primary concern over the literacy of the sailor is the rapid increase in the complexity and technology of the maintenance requirements. As this complexity and technology continues to escalate, the need for optimal training increases. This thesis reviews current training procedures and learning theory which might be applicable. It then suggests modifications of current training practice to improve the capabilities of the aircraft maintenance technician. (Author)

AD-A083 835/9 PC **A08**/MF **A01**
Naval Postgraduate School Monterey CA
Applying Organization Development to Coast Guard Affirmative Action for Black Officers.
Master's thesis,
Robert Wilmot Thorne. Dec 79, 162p

This research project was designed to demonstrate one way in which the U.S. Coast Guard could begin to develop a clear and effective strategy in its effort to increase black participation in its officer corps. An organization development change model is used as a framework to examine Coast Guard affirmative action for black officers. In using the model, developed by Beckhand and Harris in Organizational Transitions (1977), a 'present state' and a desired 'future state' of Coast Guard affirmative action is detailed. Areas examined for both the present and future states include the Coast Guard's general policy on affirmative action, the organizational climate, the recruitment practices, the selection process, and promotion and assignment policies. While recognizing the Coast Guard's task of developing an equitable posture toward equal opportunity is not an easy one, recommendations and conclusions offer suggestions for how the Coast Guard can make the transition from the present state of a desired future of affirmative action more smoothly and effectively. (Author)

AD-A083 906/8 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Relationship Between Job Satisfaction and Career Intent of D.P. Personnel in the Korean Military E.D.P. System.
Final rept.,
Cho Kil Sang. Mar 80, 123p Rept no. AFIT/GSM/SM/80M-15
Master's thesis.

This study examined the relationship between several job related variables and the career intent and job satisfaction of R.O.K. military data processing personnel. The purpose is to provide useful information for retention and effective use of military data processing personnel. Variables measured for 193 military data processing personnel using a Quality of Life survey were analyzed to determine their relationship to job satisfaction and career intent using multiple regression analysis. To assist in the selection of variables for the regression analysis, and to simplify the interpretation of results, contingency table analysis, pearson correlation analysis, frequency analysis, and factor analysis were used. The results were the following: The job satisfaction of the R.O.K. military data processing personnel appeared to be high while the career intent of the same population seemed to be low. The level of job satisfaction seemed to be closely related to satisfaction with the work itself and significantly affects career intent. But job environmental factors seemed to affect career intent more than job satisfaction. Among these job environmental factors, monetary rewards seemed to be the most important issue.

AD-A083 924/1 PC **A06**/MF **A01**
Army Training and Doctrine Command Fort Monroe VA
TRADOC Evaluation - Basic Skills Education Program. Phase I, BSEP I.
Feb 80, 119p

This pamphlet provides the historical background of illiteracy in the Army and remedial efforts to alleviate the problem and explains the chronological development of the Basic Skills Education Program Phase I (BSEP I). It includes discussion of identification of eligibles, program implementation, and screening test data of all personnel identified as BSEP I eligibles during the period 1 July 1978-30 November 1979. Additionally, a preliminary evaluation of the BSEP I Program, including a summary of responses from 18 TRADOC schools, regarding the status of BSEP I as of 30 September 1979, is included.

AD-A083 928/2 PC **A02**/MF **A01**
Navy Personnel Research and Development Center San Diego CA
The Instructional Quality Inventory IV. Job Performance Aid.
Special rept.,
John A. Ellis, and Wallace H. Wulfeck, II. Nov 78, 20p Rept no. NPRDC-SR-79-5
See also AD-A062 493.

Instructional System Development (ISD), a systematic method for developing military instruction, is used by the military services to develop or revise a large portion of the training courses. The Instructional Quality Inventory (IQI) was developed to provide quality control/evaluation procedures for ISD. This report is a job performance aid for IQI users. (Author)

AD-A083 936/5 PC **A05**/MF **A01**
Air Force Occupational Measurement Center Randolph AFB TX
Weather Equipment Career Ladder AFS 302X0.
Occupational survey rept.
Apr 80, 76p

The Weather Equipment career ladder job inventory was administered worldwide during the fall of 1979 and these data were analyzed by March 1980. Survey results are based on responses from 557 members, or 77 percent of all assigned career ladder members (CEM Code 30100 personnel excluded). Twelve job groups were identified, eight of which (representing 92 percent of the survey sample) were performing primarily organizational or intermediate level maintenance on surface or upper air weather observation equipment. The remaining job groups were distinguished by their specialization on certain equipment, depot level maintenance, or supervisory and managerial duties. Although some small groups specialized on some pieces of equipment, generally most personnel performed some maintenance on the majority of the conventional weather observation equipment (amount of time spent or equipment items varied somewhat), thus indicating a career ladder that is relatively homogeneous and stable in nature. Personnel at the 5-skill level spent almost all their job time performing technical tasks. While 7-skill level members' supervisory and managerial duties were greater than the 5-skill level airmen, they were still performing highly technical jobs, with many technical tasks performed in common with 5-skill level personnel.

AD-A083 945/6 PC **A08**/MF **A01**
Information Spectrum Inc Arlington VA
The Effects of Local Economic Conditions on Navy Enlistments.
Final rept.,
Mary Cowin, F. E. O'Connor, Lewis C. Sage, and Charles R. Johnson. 18 Mar 80, 151p Rept no. ISI-V-8086-07
Contract N00014-78-C-0492

Cross sectional multiple regression analyses of enlistment behavior in Standard Metropolitan Statistical Areas were conducted the last half of 1975 and all of 1976. Results show significant effects of local unemployment rate recruiter density, and minority population size on enlistment behavior. Management implications of results were identified and extension of study time period was recommended to provide additional information on the impact of relative wages and local minority fraction on enlistment rates. (Author)

AD-A083 946/4 PC **A13**/MF **A01**
Presearch Inc Arlington VA
Volunteer Roadmaps Update. Volume II. Figures and Tables.
Final rept.,
R. A. Holmes, and G. E. Cook. 10 Apr 80, 293p Rept no. PI-TR-454-VOL-2
Contract MDA903-79-C-0200
See also Volume 1, AD-A083 989.

Recent trends in the geographical distribution of Non-Prior Service accession results are displayed and evaluated in this report. Trends are addressed for a number of subsets of total DoD NPS accessions: Male versus Female; Black versus all races, High School Graduates versus total accessions; Mental Group I and II, III, and IV versus total accessions and service versus service. Population trends are compared with accession trends and trends in monthly level loading are also discussed in the report. The study concludes that a number of these trends may indicate the existence of current or future problems in recruiting.

AD-A083 960/5 PC **A02**/MF **A01**
Aeronautical Systems Div Wright-Patterson AFB OH Deputy for Development Planning
Analysis of Air-to-Air Combat Data and the Effect of Pilot Learning,
J. E. Bilikam, and R. K. Frick. Aug 70, 20p Rept no. ASD/XR-70-3

A definitive study to establish if a learning effect exists among pilots who routinely engage in air-to-air combat must be based on statistical analyses of combat data. Fundamental to any statistical analysis is an adequate sample size of data, with the data in a form which is appropriate for the hypothesis being tested. Combat data obtained from World War II, the Korean War, and the Vietnam War show promise of establishing the existence of a learning effect in pilots who are continually engaged in air-to-air combat over a period of time. The study reported is a preliminary effort, and the evidence thus far is inconclusive regarding the existence of a learning effect. Thus, a more detailed follow-on analysis seems justified.

AD-A083 971/2 MF **A01**
Army Research Inst for the Behavioral and Social Sciences Alexandria VA
Tank Gunnery Analysis for Developing a Tank Crew Training Data Base,
William K. Earl. Aug 78, 227p Rept no. ARI-RES PROBLEM REV-78-13
Availability: Microfiche copies only.

The research was designed to fulfill a requirement for the collection, analysis, and reporting of tank crew gunnery score data. The research was required as input for a Department of Defense net assessment study of the U. S. and Soviet tank crew training. The objectives were: (1) to provide a tank crew training data base consisting of data from at least ten tank battalions and, (2) an analysis of this data base which would permit the identification of some of the variables affecting gunnery performance.

AD-A083 976/1 PC **A02**/MF **A01**
Navy Personnel Research and Development Center San Diego CA
Participation in Navy Human Resource Management Cycle: Effect on Reenlistment Rates.
Final rept.,
Kent S. Crawford, Edmund D. Thomas, and Ervin W. Curtis. Apr 80, 19p Rept no. NPRDC-TR-80-19
See also Rept. nos. NPRDC-TR-76-5, AD-A013 226, NPRDC-TR-76-32, AD-A022 372, NPRDC-TR-76TQ-43, AD-A029 756 and NPRDC-TR-77-38, AD-A042 486.

This study investigated the effect of the Navy's Human Resource Management Cycle on retention of personnel in operational Navy units. The first-term reenlistment rates of units that had participated in HRM Cycle organizational development activities were compared with those of matched control units. Results showed substantial positive changes in reenlistment rates for HRM Cycle units during the 6-month period in which they participated in HRM activities. Significant improvements were not sustained over longer periods of time, however. It was recommended that future evaluation studies attempt to isolate those variables that may be critical to the effectiveness of the HRM Cycle. (Author)

AD-A083 982/9 PC **A04**/MF **A01**
Rochester Univ NY Management Research Center
Management Development.
Technical rept.,
Edward C. Ryterband, and Bernard M. Bass. Dec 72, 55p Rept no. TR-54
Contract N00014-67-A-0398-0012
Prepared in cooperation with Hay (E.N.) and Associates, Philadelphia, PA.

If an organization is to successfully accomplish its goals, it must have on hand a continuous and sufficient supply of competent management personnel. To provide for this ongoing supply of management personnel, an organization must realize through its management development program (1) that new positions will be created as it grows; (2) old positions will become vacant due to voluntary and involuntary retirement; (3) old skills will need to be given the new managers; (4) new skills will need to be introduced into the repertoire of present managers. Management development is one activity of the organization of mutual concern to the individual manager and the organization. An organization provides formal and informal management development programs. They aim to improve current and future managerial performance by imparting appropriate knowledge, attitudes, and increasing skills. To conduct effective management programs, organizations initially need to involve themselves in a systematic analysis of management development needs. This requires an analysis of the needs of the organization as a whole, the jobs for which training will be needed, and the men who will receive the training. Thereafter, the organization must provide the conditions in which the desired learning can take place.

AD-A083 989/4 PC **A05**/MF **A01**
Presearch Inc Arlington VA
Volunteer Roadmaps Update. Volume I. Findings.
Final technical rept.,
R. A. Holmes, and G. E. Cook. 10 Apr 80, 76p Rept no. PI-TR-454-VOL-1
Contract MDA903-79-C-0200
See also Volume 2, AD-A083 946.

Recent trends in the geographical distribution of Non-Prior Service accession results are displayed and evaluated in this report. Trends are addressed for a number of subsets of total DoD NPS accessions: Male versus Female; Black versus all races, High School Graduates versus total accessions; Mental Group I and II, III, and IV versus total accessions and service versus service. Population trends are compared with accession trends and trends in monthly level loading are also discussed in the report. The study concludes that a number of these trends may indicate the existence of current or future problems in recruiting.

AD-A084 008/2 PC **A05**/MF **A01**
Naval Postgraduate School Monterey CA
An Examination of the Quality of Current and Future Military Enlisted Personnel.
Master's thesis,
Stanley F. Halter. Dec 79, 99p

This thesis was written to synthesize some of the previous work concerning the educational attainment and mental level of recruits, the Academic Remedial Training (ART) program, the Job Oriented Basic Skills program, reading grade levels of recruits and rate training manuals, and results of interviews conducted with persons who have dealt with personnel quality issues. The main thrust of this thesis centers around an examination of the present unofficial definition of quality in the Navy (educational attainment and mental ability) and illustrates the need for an expanded definition of quality that would enable the selection criteria for enlistment to be more predictive of future behavior. (Author)

AD-A084 011/6 PC **A08**/MF **A01**
Naval Postgraduate School Monterey CA

The Prior Service Navy Veteran; An Unexploited Source of Manpower for the Decade of the 1980's.
Master's thesis,
Robert Baran Hawkins. Dec 79, 160p

This thesis studied the results attained by the six Navy Recruiting Areas in the recruitment of prior-service Navy veterans (NAVETS) for the years FY 1975-FY 1978. Data analyzed included age, marital status, level of education, entry paygrade, race and broad occupational category. Comparisons of total numbers of NAVETS recruited with total numbers of other service veterans (OSVETS) recruited were also made. Policy implications and recommendations for the recruitment of prior service Navy veterans are presented. (Author)

AD-A084 019/9 PC **A04**/MF **A01**
Air Force Occupational Measurement Center Randolph AFB TX
Legal Services Career Ladder, AFS 705X0.
Occupational survey rept.
Mar 80, 66p

Inventory booklets were administered to Legal Services (AFSC 705X0) personnel worldwide from July to October 1979. Survey results are based on the responses from 510 AFS 705X0 incumbents (75 percent of assigned). A majority of the incumbents surveyed were assigned to SAC, TAC, USAFE, and the Air Force Legal Service Center (AFLSC). DAFSC 705X0 personnel spend a majority of their job time performing military justice, claims, area defense, or general administration tasks. The five major groups of jobs and four smaller independent job types were differentiated primarily by the varying amount of time spend on the above tasks. The five clusters were: Administrative Supervisors; Area Defense Personnel; Legal Supervisors; NCOICs, Military Justice; and Claims Personnel. NCOICs, Military Justice made up the largest cluster (30 percent of sample) and concentrated primarily on performing various aspects of military justice. The four independent job types identified were: Administrative Personnel, Legal Clerks, Military Justice and Claims Personnel, and Claims Advisors. Generally, the personnel in these job groups performed a more routine job and had lower job satisfaction indices.

AD-A084 033/0 PC **A04**/MF **A01**
Navy Personnel Research and Development Center San Diego CA
Selective Retention--A Longitudinal Analysis: II. Experiences and Attitudes of Recruit Training Graduates.
Rept. no. 2, Jun-Oct 77,
Samuel B. Landau, Arthur J. Farkas, and Patricia L. Wagner. Apr 80, 52p Rept no. NPRDC-TR-80-16
See also Rept. no. NPRDC-TR-79-5, AD-A062 516.

The objectives of this effort were to determine how the attitudes and perceptions of first-term enlisted personnel changed between the beginning and end of recruit training, and to assess their perceptions of recruit training, commitment to the Navy, and future expectations. Results showed that recruits (1) were not required to engage in as many undesirable activities as they expected at the beginning of training, (2) felt positively about company commanders and peer relationships in boot camp, (3) experienced many desired work outcomes to a greater degree than expected, (4) had achieved certain desired outcomes that they had given in boot camp as their motivation for joining, (5) were generally satisfied with the Navy, and (6) felt positively about future expectations. These results indicate that, if recruits are made aware of the fact that their experiences will improve over the course of recruit training, more of them will remain in the Navy. (Author)

AD-A084 067/8 PC **A06**/MF **A01**
Training Analysis and Evaluation Group (Navy) Orlando FL
Learning of Procedures in Navy Technical Training: An Evaluation of Strategies and Formats,
Anne M. Polino, and Richard Braby. Mar 80, 113p Rept no. TAEG-84

This study compared the effectiveness of three types of handbooks utilized by students in learning to perform procedural tasks. The handbooks are the traditional narrative presentation, the job performance aid, and the learning aid. The study is the second in a series for the Naval Technical Information Presentation Program (NTIPP) conducted by the Training Analysis and Evaluation Group (TAEG) in the design of machine producible instructional formats compatible with the learning guidelines in the Interservice Procedures for Instructional Systems Development. These formats were conceived to provide effective support for learning and were designed to be constructed by computer routines from basic task information stored in a digital data base. In this study, the Job Performance Aid and Learning Aid were the machine producible formats. The main conclusion was that the learning aid format was superior to the other formats tested when the goal was to have students accurately perform the procedure from memory. However, if the goal was to teach verbal information about the procedure, such as nomenclature or system theory, none of the formats appeared to be adequate.

DOE/TIC-11110 MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
RECON Training Materials.
69p
Contract W-7405-ENG-48
Microfiche copies only.

This collection of materials for use in a DOE/RECON training session includes information about terminal commands, logging on, document availability, search strategy models, and some of the data bases available on DOE/RECON. An evaluation questionnaire is included. (ERA citation 05:017310)

ED-175 439 Not available NTIS
Utah State Univ., Logan. Merrill Library.
Proposed Five-Year Plan for the Division of Instructional Development, Merrill Library and Learning Resources Program, Utah State University, Logan, Utah,
J. N. Eastmond, Jr. 7 May 79, 32p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

Given the difficulty of representing the interests of a diverse faculty such as Utah State University, this 5-year plan has sought relevant information from both faculty and administrators in an assessment of the needs of the university for this period. Some conclusions about needs have been drawn from existing data: enrollment can be expected to remain steady or to experience a slight decline; the emphasis on quality teaching will increase; students are dissatisfied with survey courses; critical skill areas include communications, problem solving, and managerial practices; and graduate teaching assistants have little preparation for teaching other than their specific academic training. The objectives of the Instructional Development Office are reviewed in the context of these needs, and areas of staffing and financing of instructional development activities are addressed. An implementation flow chart of activities scheduled in the instructional development office over the next five years is provided, as well as a list of references and the tabulated data from a survey of undergraduate students in survey courses.

ED-175 459 Not available NTIS
Montgomery County Public Schools, Rockville, MD.
Projection for the Future of Instructional Computing in the Montgomery County Public Schools,
Joseph P. Fennell. Feb 77, 42p HumRRO-FR-ED-77-3
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This report summarizes the findings of a one man-month study of the current status and future direction of instructional computing in the Montgomery County, Maryland, Public Schools including computer assisted instruction, computer managed instruction, computer assisted problem solving, and data processing education. The report is presented in six sections: (1) the approach--a description of the methods used for gathering information; (2) current status of instructional computing in the MCPS system--brief description of the present deployment and use of computer terminals in the schools and the Learner-Centered Management Support System (LCMSS); (3) the future of instructional computing in questions about the validity os such predictions; (4) a descriptive analysis of the MCPS computer system; (5) possible future developments in instructional computing, investigating alternatives for expansion and relating costs for these alternative methods; and (6) recommendations summarizing the major findings of the study.

ED-175 469 Not available NTIS
National Cancer Inst., Bethesda, MD.
Cancer Information in the Workplace: Education Materials for the Public and the Health Professional.
May 79, 59p DHEW/PUB/NIH-79/2001
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This document is an annotated compilation of citations to materials on occupational carcinogens, as well as on agencies and data bases dealing with the topic, which are available for use in public, worker, and professional education programs. The bibliography is intended to assist health educators, industrial hygienists, and health care providers in identifying and selecting appropriate educational materials. The criteria for selection were availability and currency; items produced before 1970 were not considered timely. Materials can be obtained from the sources listed. Six computerized data bases are described and 13 Committees on Occupational Safety and Health (COSH) and 10 Educational Resource Centers of the National Institute for Occupational Safety and Health (NIOSH) are listed with addresses and telephone numbers. Author, title, and subject indexes are provided.

HRP-0902072/8 MF **A01**
Pennsylvania Univ., Philadelphia. Emergency Medical Services.
Subcontracting. Instructor's Manual,
C. Gene Cayten. 1979, 142p
Available microfiche only because of poor quality.

The emergency medical services system administrator is faced with completing a large number of tasks in implementing a comprehensive operating EMS system. The completion of these tasks requires a vast array of skills, some of which the administrator and his staff possess. However, in some instances, it will be necessary to subcontract for specific services or for specific items of hardware. The aim of this particular session is to prepare the EMS administrator to be able to effectively develop an RFP, (Request for Proposal) to be able to rationally evaluate the proposal submitted in response to the RFP, and to develop the necessary contracts when subcontracting for services.

HRP-0902074/4 PC **A10**/MF **A01**
Creighton Univ., Omaha, NE. Coll. of Nursing.
Rural Emergency Nursing Instructors Manual,
Margaret Miller. 1979, 205p
Contract PHS-HRA-232-78-0179

The Rural Emergency Nursing manual is a composite of essential emergency nursing content for the rural emergency department nurse instructor. Each content module was developed by a recognized professional in the 'specific' area. The developer is identified on each module. The focus is on patient assessment and priority interventions necessary to establish and maintain visual functions and to promote stabilization of the emergency department patient. Furthermore, content modules on the Emergency Medical Services (EMS) System and the functional nursing roles within it are included. Content regarding policy and protocol development is essential for the rural emergency department nurse who is many times the only professional health care provider in the rural hospital when the emergency department patient presents. Teaching/learning principles and methods acquaint the rural nurse-instructor with practical information regarding the development and structure of educational programs for local and regional health care professionals and para-professionals. This manual is the outcome of two courses presented during 1979 for selected rural emergency nurses who are now prepared to serve as nurse/

instructors of emergency nursing care in their regions.

HRP-0902075/1 PC **A03**/MF **A01**
American Society of Allied Health Professions, Washington, DC.
Survey Procedures for Allied Health Collegiate Education Programs.
Final rept.,
Richard S. Nunn. 14 Mar 80, 31p
Contract PHS-HRA-231-77-0111

Work under this contract addresses the need for accurate and comprehensive analysis of health manpower data, as authorized through Section 708 of the Health Professions Educational Assistance Act of 1976 (P.L. 94-484). The current effort is the fourth in a series of contracts undertaken by ASAHP to collect and analyze data pertaining to collegiate allied health training programs. The scope of work encompasses four general areas: (a) refinement of data collection instruments and procedures for conducting a future Collegiate Inventory; (b) development of content and format for a directory listing information contained in such a Collegiate Inventory; (c) analysis of 1973-74 and 1975-76 inventories of collegiate and hospital-based educational programs; and (d) exploratory reports on the feasibility of data collection for other post-secondary allied health training settings, and on the classification of allied health educational programs.

HRP-0902081/9 PC **A03**/MF **A01**
Washington Univ., Seattle. School of Medicine.
Conduct and Evaluation of the WAMI Program of Regionalized Medical Education.
Rept. for 30 Sep 77-31 Jul 78,
M. Roy Schwarz. 31 Aug 78, 44p
Contract PHS-HRA-231-77-0120

WAMI is a four state (Washington, Alaska, Montana and Idaho) cooperative medical education program at the University of Washington School of Medicine (UWSM). Under the 'University Phase' of the WAMI Program about 70 students in the UWSM begin their medical education at Washington State University (WSU), University of Alaska (UA), Montana State University (MSU), or University of Idaho (UI) rather than in Seattle. Upon completion of their first year of education at one of these participating universities, students enroll at Seattle and join their other classmates. During the third and fourth years of medical school, UWSM students may receive six week blocks of clinical training at selected sites in the WAMI states as part of the 'Community Phase' of WAMI at one or more Community Clinical Units (CCUs); as of July 1978 there were 17 active CCUs. Graduate medical students in certain types of residency training at the UWSM may also elect to rotate through some of the CCU sites for 6-12 weeks of formal community based training.

HRP-0902082/7 PC **A02**/MF **A01**
Alabama Univ. in Birmingham. Graduate Program in Hospital and Health Administration.
Initiation of Student-Paced Learning Modules in Graduate Training Programs in Health Administration/Planning. Executive Summary of the Final Report.
Final rept. 1 Oct 78-31 Dec 79,
Tee H. Hiett. 1979, 8p
Contract PHS-HRA-232-78-0182

The dominant thesis or theme of this project was that education in many subjects in quantitative methods, financial management, and health economics in health services administration could be more efficient if the teachers had access to a large number of modules from which to select specific modules. A second theme was that there was a potential for such a large number of these modules and that so much effort was required to develop even a few modules that teachers should collaborate in the development, maintenance, and exchange of modules . On March 20, 1979, 35 participants from 20 universities throughout the United States, along with seven visitors and consultants, met at UAB for a three-day workshop devoted to developing, maintaining, and sharing modules; using modern word-processing technology to develop, to maintain, and even to share modules; using the modules in the self-paced mode of instruction, and the concept of a national organization to stimulate the development and exchange of modules.

N80-22283/9 PC **A11**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Resource Management on the Flight Deck.
G. E. Cooper, M. D. White, and J. K. Lauber. Mar 80, 247p NASA-CP-2120
Proceedings of a NASA/Industry Workshop, San Francisco, 26-28 Jun. 1979.

No abstract available.

PB80-172430 PC **A05**/MF **A01**
National Urban League, Inc., Washington, DC. Research Dept.
Catalogue of Profiles of Past and Current Effective Job Development Strategies for Low-Income and Disadvantaged Groups.
Final rept.,
Robert B. Hill, and Cheryl Randall. 30 Dec 77, 81p HUD-0000829
Grant HUD-H-2546RG

This National Urban League catalog of effective job development programs is meant to be a sourcebook for public officials, community organizations, and others promoting job development strategies. It describes the activities of 20 successful programs which provided jobs for socially handicapped groups -- low - income individuals, racial minorities, women, teenagers, and the elderly. Some programs utilized community agenices in the planning and delivery of manpower services, some coordinated work experience and training, some used alternatives to traditional schooling to enhance employability, while others coordinated skill development with housing rehabilitation and urban renewal. Technical and financial assistance for minority businesses, leveraging for financial assistance loans that are contingent upon employment of the disadvantaged, and attracting businesses to an area are other techniques covered. A few programs placed women in nontraditional jobs, and one increased minority employment in the criminal justice system. Each program profile contains the name of the program; the name, address, and telephone number of a contact person; the administering agency, if applicable; information on funding; a program description; data on specific activities and supportive services; a highlight of program strategies; linkages with public and private agencies in the community; and a listing of major accomplishments. A few of the program descriptions also have references appended.

PB80-172455 PC **A03**/MF **A01**
National Urban League, Inc., Washington, DC. Research Dept.
Guide for Enhancing Employment Opportunities for Low-Income and Disadvantaged Groups in Community Development Block Grants (CDBG) Target Areas.
Final rept.
31 Dec 78, 50p HUD-0000831
Grant HUD-H-2546RG

This National Urban League study found that many low - income area residents have a much wider variety of occupational skills and educational levels than is commonly believed. An important step in improving employment opportunities for economically disadvantaged persons involves identifying these skills and attracting industries which can use them. Five programs funded by the Comprehensive Employement Training Act (CETA) are described as examples of the successful identification of skills and the improvement of these skills through training. In addition, 20 communities used Community Development Block Grants (CDBG) to enhance employment opportunities for the elderly, minorities, teenagers, and women. The most successful of these programs have attracted industries that needed the skills possessed by low - income residents, by attempting to locate industrial parks near such persons. Often, programs have promoted customized manpower services as part of an industrial development incentive package. Worker training, subsidies for minority businesses, commercial revitalization of low - income and minority neighborhoods, and skills training in connection with housing rehabilitation have also proved successful. Highlights of these programs show how a combination of techniques were used to increase employment. Charts and tables give selected program statistics, and a matrix identifies the approaches used in each of the 20 CDBG cities. Footnotes are included.

PB80-172679 MF **A01**
National Center for Productivity and Quality of Working Life, Washington, DC.
Improving Governmental Productivity: Selected Case Studies.
1977, 84p HUD-0000868
Paper copy available from the Sup. of Docs., Stock number 052-003-00353-8.

This report contains descriptions of nine attempts by public officials in seven governmental jurisdictions to improve productivity. The jurisdictions include three cities, three counties (including one combined city / county government), and one State agency. Two of the seven jurisdictions are represented by two cases each. The case studies describe productivity in San Diego County, Calif.; Fairfax County, Va.; Charlotte, N.C.; Seattle, Wash.; Honolulu, Hawaii; Dallas, Tex.; and the California Department of Motor Vehicles. The cases were drawn from a diversity of public service functions: processing food stamp applications, construction inspections, motor - vehicle licensing, street cleaning, road repair, public park operations, engineering, and water supply and distribution. Some of the efforts produced impressive results. In its food stamp program, San Diego County achieved a 70 percent increase in efficiency and reduced client waiting time from an average of 66 minutes to 16 minutes. In Honolulu, the street - resurfacing crew more than doubled its daily output. Seattle's engineering department reduced costs by almost $.5 million per year. However, not all cases are unequivocal successes. The Dallas 10 - hour, 4 - day week experiment in street cleaning and street repair was abandoned because benefits appeared too marginal to warrant continuation. Tabular data and a brief annotated reference list are included.

PB80-172729 PC **A05**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
Prepurchase Counseling Curriculum for the Prepurchase Homeownership Counseling Demonstration.
Peter E. Finn, and Antony A. Phipps. Jun 78, 96p HUD-0000873

This manual serves as a guide in the preparation and delivery of counseling services to first - time homebuyers enrolled in the demonstration for counselors involved in the Prepurchase Homeownership Counseling Demonstration. HUD is conducting the program to learn whether prepurchase homeownership counseling can reduce the rate of mortgage default and foreclosure among Federal Housing Administration insured and subsidized mortgagors (low - income and moderate - income) and increase the ability of first - time homebuyers to deal effectively with the problems of homeownership. In Philadelphia, Pa., Atlanta, Ga., and Phoenix, Ariz., four basic counseling variations will be tested: group counseling sessions, group and individual counseling, individualized advocacy counseling, and no direct counseling. Individuals in the noncounseled group will receive copies of the Homebuyer's Information Package, and their progress in buying and owning homes will be monitored throughout the demonstration period. Unlike the other groups, these participants will have no contact with counselors. Further distinctions are made among the counseling methods, and a detailed counseling curriculum for each counseling variation is used. Counselors, the manual suggests, should become familiar with the different counseling techniques to be employed with all three counseling variations. They should use only those counseling approaches which are described for the particular group, however, in order to determine whether one counseling approach is better than another. Advice is also provided on handling participant's problems, dealing with other housing actors, adapting to local circumstances, involving participants in decisionmaking, and preventing dependency relationships. No references are provided.

PB80-172737 PC **A04**/MF **A01**
Abt Associates, Inc., Cambridge, MA.

Counselor Training Curriculum for the Prepurchase Homeownership Counseling Demonstration.
Denise J. Nunes, and Antony A. Phipps. Jun 78, 67p HUD-0000874

This curriculum manual provides a brief description of the background and purpose of the Prepurchase Homeownership Counseling Demonstration, the design of and objectives for followup training, as well as the detailed training program. The Demonstration is designed to test the effectiveness of prospective - homebuyer training in reducing the number of mortgage defaults and foreclosures among Federal Housing Administration insured and subsidized mortgagors. Slated for demonstration in Philadelphia, Pa.; Atlanta, Ga.; and Phoenix, Ariz., the project will be conducted by trained counselors who have completed the intensive 3.5 - day workshop. The training mode will be mainly 'group process' with emphasis on site - specific aspects. Local housing professionals -- HUD officials, real estate lawyers, and members of the Mortgage Banker's Association -- will be asked to participate. Training will focus on the information, skills, and services that counselors must provide to demonstration clients; particularly those involving the decision to buy, the choice of neighborhood and house, purchase contracts, financing, closing, family financial management, home maintenance, repairs, and improvements. Participants will be shown how to use group process techniques, facilitate decisionmaking, develop client self - reliance and independence, and develop awareness of variations in adult learning styles and counselor / client values. Counselors' roles as information resources, facilitators, partners, guides, and buyer's agents will be stressed. Daily CTC agendas and outlines of business are provided, along with notes and materials needed and time limitations.

PB80-177223 PC **A12**/MF **A01**
California Univ., Irvine.
The Impact of Labor-Management Relations on Productivity and Efficiency in Urban Mass Transit: Employee Attitudes, Withdrawal Behavior, and Bargaining Unit Structure.
Final rept. Jul 78-Sep 79,
James L. Perry, and Harold L. Angle. Mar 80, 260p DOT/RSPA/DPB/50-80/5
Contract DOT-RC-82002
See also report for Jul 77-Sep 78, PB-294 721.

The study comprises the second year's effort in a research project investigating the impact of labor-management relations on productivity and efficiency in urban mass transit. Overall focus of the research is on the impact of four controllable aspects of the labor-management situation (i.e., the legal framework, bargaining structure, the labor-management relationship pattern, and the collective agreement) on four components of transit performance: service effectiveness; service efficiency; employee withdrawal (i.e., turnover, absenteeism and tardiness); and organizational adaptability. The second year's research focused on three topics: (1) the causes and impacts of organizational commitment in lower-level transit employees; (2) the causes and impacts of turnover and absenteeism; and (3) the relationship between bargaining unit structure and transit performance.

PB80-177447 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
NBS Staff Participation in Outside Standards Activities, 1979 Highlights.
Final rept.,
JoAnne R. Debelius. Mar 80, 68p NBS-SP-573

NBS uses a decentralized system for managing the participation of NBS representatives in outside standards committees activities. This type of management is governed by NBS policy; coordinated through standards offices in each NBS Major Organizational Unit; and monitored and supported by the Office of Standards Information, Analysis and Development (OSIAD). The report summarizes NBS' standards activities during calendar year 1979. It contains information on NBS staff participation on standards committees, highlights of significant technical and individual contributions made by NBS staff, a description of NBS standards management activities, and a directory of staff participating on committees.

PB80-177959 PC **A11**/MF **A01**
Illinois Univ. at Urbana-Champaign. Inst. of Labor and Industrial Relations.
The Effects of Regulation on Airline Collective Bargaining.
Final rept.,
Wallace Hendricks, Peter Feuille, and Carol Szerszen. Jul 79, 246p LMSA/DRA-80/03
Contract DL-J-9-P-7-0175

The principal objective of the report was to investigate the effect of product market regulation on the processes and outcomes of collective bargaining in the U.S. commercial airlines industry. The authors discuss the reasons for regulation; describe the markets served, the companies participating in various industry segments, and the kind of regulation to which they are subjected; and examine the structure, regulation and process of the airline labor relations system. Finally, an assessment is made of the direct and indirect effects of regulation on airline employment conditions. The authors' analysis suggests that the protective environment of government regulation has enabled the airline unions to bargain more favorable contracts than otherwise would be the case.

PB80-178189 PC **A06**/MF **A01**
Planning and Human Systems, Inc., Washington, DC.
Studies of I. The Job Corps Allowances System. II. The Job Corps Home Leave Policy,
Frances Georgette, William Tash, and Jane Watson. Apr 79, 118p DLETA-20-11-76-37-1
Contract DL-20-11-76-37

The purposes of the allowance system study were to: (1) explore the impact of changes in Job Corps allowances on the retention rates of Corpsmembers at three different centers; (2) develop hypothesis and findings relative to the probable factors leading to early departures. Findings suggest factors leading to early dropping out included not being able to enter or qualify immediately for training of choice, homesickness, personal adjustment problems, length of training program, and various characteristics of center and staff which are incompatible with trainee's expectations. The purpose of the home leave policy study was to determine whether the 30-45 day loss rate would decrease if Corpsmembers took home leave at 45 days instead of 6 months. Also examined was the impact on Center operations. Findings were that the 45 day home leave did not improve trainee retention rates, morale, or attitudes but did increase recruitment and Center operation costs.

PB80-178262 PC **A03**/MF **A01**
Office of Personnel Management, Washington, DC. Workforce Effectiveness and Development Group.
Upward Mobility: Considerations from Program Planning and Development,
Janice B. Smith. Nov 79, 46p WLA-2

The publication outlines Upward Mobility program issues, strategies, and approaches and serves as a comprehensive information guide. It is of particular value to those planners who are developing, refining, or expanding Upward Mobility programs. It shows that basic program strategies, coupled with unique agency characteristics, can be blended to create an effective program tailored to an agency's special needs. The creation of such dynamic programs strongly affirms the basic tenants of Upward Mobility--the development and implementation of career opportunities to enable lower level employees to realize their full work potential.

PB80-178684 PC **A09**/MF **A01**
Westat, Inc., Rockville, MD. Research Div.
Continuous Longitudinal Manpower Survey. Report No. 9. Characteristics of Enrollees Under Age 22 Who Entered CETA Programs During Fiscal Year 1978 (October 1977 through September 1978).
Final rept.
Jan 80, 195p MEL-79-23
Contract DL-23-24-75-07
See also report no. 8, dated Mar 79, PB-300 973.

This is the ninth report from the Continuous Longitudinal Manpower Survey (CLMS) of a national sample of participants in decentralized programs under the Comprehensive Employment and Training Act (CETA). It is on the characteristics of enrollees under age 22 who entered CETA programs during Fiscal Year 1978.

PB80-178692 PC **A07**/MF **A01**
Washington Univ., Seattle.
Assessment of Care and Continuing Dental Education: Final Report and Executive Summary.
Rept. for 30 Jun 75-31 Dec 78,
Peter Milgrom. 22 Feb 80, 148p NCHSR-80-38
Grant PHS-HS-01645

The study investigated the impact of personalized feedback to practitioners on the quality of their restorative dental treatment. Serviceability of restorations of 105 volunteer dentists, a representative sample of Washington State general practitioners, was examined through patient recall before and after personalized feedback by letter or interview from trained counselors. Pre-invention examinations were by peer review. The proportion of serviceable restorations in each office sample was high. Dentists who received feedback improved significantly more than those who did not. No differences in effectiveness were found between letters and interviews. Related studies examined the association between certain practitioners and patient characteristics and quality of care. Preference for active forms of continuing education was shown to correlate positively with high quality care. Results have implications assuring the quality of care for recipients of dental treatment.

PB80-182553 PC **A10**/MF **A01**
Berkeley Planning Associates, CA.
Operations of the Special SSDI and SSI Vocational Rehabilitation Programs: Eight Case Studies.
Final rept.,
Richard Dodson, Susan Shea, Linda Barrett, Eileen Bleeker, and Shirley Langlois. Feb 80, 217p ASPE-SSHD-78-14
Contract DHEW-100-78-0066
See also PB80-180565.

Eight states were selected for the purpose of carefully examining DI/SSI Rehabilitation program administration, VR counselor and supervisory practices, problems in carrying out the special program requirements, and examining the role of the disability determination and social security staff relative to the special programs. A cross-state analysis isolates as texts of both the VR special program structure and within the eight states, focusing on program differences as well as program innovations with an eye toward areas for policy recommendations. Data were obtained via interviews with VR personnel at all agency levels as well as interviews with disability determination, Social Security, and Regional RSA staff.

PB80-183262 PC **A12**/MF **A01**
Johns Hopkins Univ., Baltimore, MD.
Inventories and the Short-Run Demand for Labor.
Final rept.,
Robert J. Rossana. Apr 80, 253p DLETA-91-24-77-34-1
Grant DL-91-24-77-34

The report contains a theoretical and empirical analysis of the interaction of employment, inventories and unfilled orders. Evidence is provided that inventories of finished goods have a negative impact upon employment accumulation whereas unfilled orders have a positive impact. Employment is also found to be an important determinant of inventory accumulation. A demand for hours equation is also derived and estimated and it is found that inventories of finished goods have a negative impact on hours demand whereas unfilled orders have a positive impact on the demand for hours per man.

PB80-187263 PC **A08**/MF **A01**
National Science Foundation, Washington, DC. Directorate for Science Education.
Science Education Databook.
Final rept.,
Alphonse Buccino, Donald J. Dessart, Howard P. Levine, and Mary S. Rivkin. May 80, 156p NSF-SE-80-3

Science education, which must insure an adequate supply of talented and educated personnel for the

scientific and technological enterprise and must provide a basic understanding of science to enable all citizens to make informed decisions of personal choice and public policy that involve science and technology, is a central concern of our nation today. While there is a good deal of information available regarding science on the one hand, and education on the other, there has not been available in one place a compendium of quantitative information portraying science education in the United States. The Science Education Databook is intended as a step toward filling that need. The data have been assembled in six chapters: Resources; Participation; Attitudes, Goals, and Needs; Test Data; Degree Data; and Employment in Science and Engineering.

5J. Psychology (Individual and Group Behavior)

AD-A083 670/0 PC **A02**/MF **A01**
Naval Submarine Medical Research Lab Groton CT
Factor Analysis of Perceptual and Cognitive Abilities Tested by Different Methods,
Jo Ann S. Kinney, and S. M. Luria. 19 Oct 79, 15p Rept no. NSMRL-892
Pub. in Perceptual and Motor Skills, v50 p59-69 1980.

No abstract available.

AD-A083 686/6 PC **A18**/MF **A01**
SysteMetrics Inc Blacksburg VA
An Annotated Bibliography on Operator Mental Workload Assessment.
Final rept. Jun-Dec 79,
Walter W. Wierwille, and Beverly H. Williges. 26 Mar 80, 413p NATC-SY-27R-80
Contracts N00421-79-M-2833, MIPR-ATL-79-6
See also Rept. no. S-78-101 dated Sep 78, AD-A059 501.

An annotated bibliography on operator mental workload is presented with supporting information. This bibliography is based upon two literature searches, one performed in 1977 in support of a survey and analysis catalog (AD A059 501) and one performed in 1979 as an update. Each literature citation presented contains reference information, an abstract, a numerical workload technique category classification, a numerical operator behavior classification, and a group of word descriptors. Workload methods are divided into 28 specific techniques in four major categories: opinion, spare mental capacity, primary task, and physiological. Applicable operator behaviors are similarly divided into categories. The descriptors associated with each citation designate the general workload classification, the specific workload classification, the type of presentation, the type of facilities used, and the potential aircrew application. Over 600 citations are presented. Two indexes are also provided. The first is a workload technique index, and the second is an experimental facility index. It is concluded that periodic updating of the bibliography will be required and that attention should be directed toward computerizing future workload bibliographies. (Author)

AD-A083 710/4 PC **A07**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
The Moderating Effects of Group Membership and Growth Need Strength on the Relationships between Job Characteristics and Job Satisfaction, Job Involvement, and Intrinsic Motivation.
Master's thesis,
David L. Henson. Dec 79, 144p Rept no. AFIT/GSM/SM/79D-17

The primary purpose of this thesis is to investigate the moderating effects of organizational differences and individual differences on the relationships existing between job characteristics and intrinsic motivation, job involvement, and job satisfaction. Measures used to describe the job characteristics and intrinsic motivation are derived from the short form version of the Job Diagnostic Survey (JDS) developed by Hackman and Oldham (1974). The measures used to describe job involvement and job satisfaction are derived from scales developed by Lodahl and Kejner (1965) and Hoppock (1935), respectively. A survey was distributed to 872 officers, grade 0-1 through 0-5, who were members of 8 Systems Program Offices (SPO) within the Aeronautical Systems Division, Wright-Patterson AFB, Ohio. In order to obtain meaningful responses based upon adequate job experience, only respondents working at their present jobs longer than six months were included in the data base. Of the 579 surveys returned, 409 met this arbitrary time limit and were usable for data analysis.

AD-A083 711/2 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Use of Electromyogram Information to Improve Human Operator Performance.
Master's thesis,
Mark Charles Kipperman. Dec 79, 108p Rept no. AFIT/GSM/SM/79D-18

This research was conducted to investigate the effects of electromyogram (EMG) biofeedback on learning and performance of a compensatory hand-eye tracking task. A total of twenty male subjects took part in the experiments, with each participating in at least 48 scored tracking runs on the Roll Axis Tracking Simulator. The subjects were divided into three groups. The control group received no biofeedback, the first experimental group received biofeedback relaxation training and biofeedback while tracking, and the second experimental group received biofeedback relaxation training only. Comparisons across the three groups showed significant differences in muscle tension levels, but no significant differences in performing the tracking task. Analysis of scores from each subject showed learning to have the most significant relationship to score, and demonstrated the log/log nature of the learning curve. When averages were taken across all subjects, 98 percent of the variance in logarithm of score was accounted for by the relationship with logarithm of run number. (Author)

AD-A083 714/6 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
A Policy-Capturing Investigation of Expectancy Theory Models of Valence and Force.
Master's thesis,
Norbert C. Wagner, Jr. Dec 79, 120p Rept no. AFIT/GSM/SM/79D-21

The purpose of this thesis was to examine the valence and force models of Vroom's expectancy theory of motivation. In particular, this study was designed to (1) use policy capturing to test the valence model and determine if knowledge of second-level valences increases one's ability to predict first-level valence; (2) test the force model at three levels of expectancy, 0, 0.4, and 0.8, to determine whether the function associated with expectancy has a binary (0 or 1) rather than a continuous nature; and (3) investigate te correlation between force and locus of control. (If expectancy has a binary nature, when expectancy is zero, force is zero; when expectancy is greater than zero, force is equal to first-level valence.) One hundred fifteen Air Force Institute of Technology graduate students participated in the study. Three types of instruments were used to collect data from five different groups. All five groups received instruments related to job choice or job satisfaction; one group also received a student effort instrument. Each instrument was designed to capture valence and effort decision in 24 different situations.

AD-A083 788/0 PC **A02**/MF **A01**
Air Force Human Resources Lab Brooks AFB TX
A Methodology to Evaluate the Aptitude Requirements of Air Force Jobs,
Lloyd Burtch. 3 Nov 78, 14p
Presented at the Annual Conference of Military Testing Association (20th), Oklahoma City, OK, 30 Oct-3 Nov 78.

Aptitude requirements for entry into various Air Force career ladders are presently determined in part by the judgement of responsible personnel and in part by tradition or precedent. A precise correspondence between the aptitude scores of Air Force personnel and the aptitude requirements of Air Force jobs is extremely important since the Air Force recruits a fixed amount of talent every year and there is more demand for this talent than one might expect. There exists an additional requirement for contingency plans should the talent pool shrink or offer fewer highly talented individuals. Even assuming the current talent remains unchanged, it may be more cost effective to shed some specialties into jobs with varying aptitude requirements because of differences in the actual tasks performed. The Air Force Human Resources Laboratory (AFHRL) has initiated the first systematic study to fully evaluate the aptitude requirements of Air Force specialties. The approach uses measures of learning difficulty at the task level to infer aptitude. The methodology was developed in an evolutionary manner from research documented by Fugill (1972, 1973). Christal (1973) as well as Maginnis, Uchima and Smith (1975) have further described this technology. The present paper will describe the development of task difficulty benchmark scales, their application, and will include a brief discussion of the results.

AD-A083 798/9 PC **A03**/MF **A01**
Stanford Univ CA Dept of Psychology
The Framing of Decisions and the Rationality of Choice.
Technical rept. Jan 79-Mar 80,
Amos Tversky, and Daniel Kahneman. 1 Apr 80, 34p Rept no. TR-2
Contract N00014-79-C-0077

The psychological principles that govern individual decision making produce predictable reversals of preferences when the same decision problem is framed in different ways. Inconsistencies are illustrated in choices involving monetary outcomes, both hypothetical and real, and in policy questions that pertain to the loss of human lives. Our analysis questions the descriptive adequacy of the standard rational model and highlights the dependence of the normative theory of choice on the psychology of hedonic experience. (Author)

AD-A083 973/8 PC **A04**/MF **A01**
Colorado Univ At Boulder Inst for the Study of Intellectual Behavior
Comprehension and Analysis of Information in Text. II Decision Making with Texts.
Technical rept. 1 Jul-30 Nov 79,
Ely Kozminsky, Walter Kintsch, Paul Coren, and Lyle E. Bourne, Jr. Dec 79, 62p Rept no. TR-89-ONR
Contract N00014-78-C-0433
See also report dated Jul 79, AD-A074 884.

Decision making based on information in texts was studied in a laboratory analogue of a complex, natural, information-analytic domain. Subjects acting as stock brokers acquired a conjunctive decision rule for predicting the market performance of a fictitious stock. Subjects read quarterly reports containing information on six market-information categories, of which only two were relevant to correct decisions. Decision performance differentiated between Learners (subjects who discovered the relevant categories) and Nonlearners. Hypothesis selection behavior was similar to that reported with simpler concept learning problems. The category recall pattern reflected hypothesis selection, decision behavior, and subjects' overall category identification strategies. Further, these data were congruent with a model of text comprehension. Effective decision making in this task was viewed as the ability to acquire an appropriate control schema to guide comprehension and analysis of complex, often unreliable text inputs. (Author)

AD-A083 984/5 PC **A05**/MF **A01**
Navy Personnel Research and Development Center San Diego CA
A Cross-Cultural Comparison of Managerial Practices and Their Relationship to Organizational Outcome Variables.
Final rept.,
James A. Riedel, Leanne E. Young, and John P. Sheposh. Apr 80, 95p Rept no. NPRDC-TR-80-22
See also Rept. nos. NPRDC-TR-79-9, AD-A066 190 and NPRDC-TR-80-8, AD-A079 541.

This study addressed the relationships between employee perceptions of organizational effectiveness and managerial, organizational, and satisfaction variables. Questionnaires designed to meas-

ure work center effectiveness, organizational climate, job characteristics, supervisory influence, managerial practices, job satisfaction, role stress, and work occurrences were administered to a sample of 1607 employees drawn from all hierarchical levels at four Public Works Centers (PWCs) in the U.S. (including Pearl Harbor); the PWC in Yokosuka, Japan; and the PWC at Subic Bay, PI. Results indicated that (1) managers and supervisors were generally more positive as to work center performance, management efficiency, and organizational character than were workers, (2) perceptions of management effectiveness are affected more by specific job-related concerns than they are by non-job-related managerial practices, (3) well defined job responsibilities and feelings of esprit de corps contribute most to empolyee satisfaction, and (4) employees are motivated by work occurrences that reflect personal concerns (e.g., feelings of accomplishment) and demotivated by those that reflect task-related concerns (e.g., equipment problems). (Author)

AD-A083 994/4 PC **A03**/MF **A01**
Washington Univ Seattle Dept of Psychology
Personality and Selective Attention.
Technical rept.,
Stevan L. Nielsen, and Irwin G. Sarason. 28 Mar 80, 48p Rept no. SCS-LS-010
Contract N00014-75-C-0905

Interest in the relationship between cognitions and behavior has drawn personality researchers and clinical psychologists to incorporate models of information processing into their own paradigms. In this study, the effect of presenting emotionally salient material preattentively - during shadowing - was examined, along with the interactive effects of personality variables. College students high in anxiety were found to hear sexually explicit messages imbedded in an unattended message, and as a result to experience difficulty in shadowing. Intrusion of the sexually explicit material and interference with shadowing did not occur for those low in anxiety. If subjects did not hear or were not presented with these messages in the unattended channel, personality variables still tended to predict subjects' judgments about these messages. In this one task, evidence was found for mediation of cognitions by emotional and personality factors at both attentive and preattentive levels of processing. These mediational effects were sometimes specific to level of processing, e.g., one emotional message received one response during the highly attentive processing involved in applying a judgment and quite a different response during preattentive processing.

AD-A084 066/0 PC **A13**/MF **A01**
System Research Ltd Richmond (England)
Cognitive Mechanisms and Behaviours Involved in Other than Institutional Learning and Using Principles of Decision.
Research note Sep 76-Sep 78,
Gordon Pask. Feb 80, 276p ARI-RN-80-4
Grant DA-ERO-76-G-069

The report describes studies of individual and team decision making in complex command, control and communication systems involving man machine and computer regulated interaction. The most recent advance is a comprehensive team decision system able to exteriorise normally hidden conceptual operations as behavioural records. The system has training, testing and operational applications. It incorporates an on line, novel concept, interrogation system, records for which (together with logging the condition of a space environment) provide indices of decision making style and performance which are compared with data from (also novel) tests for learning style. The system also incorporates a computer implemented planning and representation method as well as an environment in which the decision process is instituted by essential bifurcations. The method is a micro-behavioural conversation, based on conversation theory, from the conversation laboratory studies.

NUREG/CR-0989-EX-SUM
PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
The Visual Aesthetic Impact of Alternative Closed Cycle Cooling Systems. Executive Summary.
Final rept. Jan 78-Feb 80,
J. W. Currie. Apr 80, 25p PNL-2952-EX-SUM
See also Main Report, NUREG/CR-0989.

The objective was to produce a validated methodology that can provide timely predictions of the visual aesthetic impact on people viewing alternative closed cycle cooling systems on nuclear power plant landscapes. First, visual aesthetic impact (VAI) measure was defined. The VAI measure chosen was the maximum amount people would be willing to pay (WTP), or the minimum amount they would be willing to accept (WTA) in compensation, for visible changes on nuclear power plant landscapes. The next step was to collect the data required using 'bidding game' questionnaires to elicit respondents' WTP and WTA for visible differences between natural and mechanical draft cooling towers and plumes. Data were collected on VAI and other variables at six U.S. sites and analyzed to produce a statistical relationship between visual aesthetic impact and theoretically related variables.

N80-22984/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Theory of the Decision/Problem State.
D. L. Dieterly. Apr 80, 21p NASA-TM-81192, AFHRL/H80-104

A theory of the decision-problem state was introduced and elaborated. Starting with the basic model of a decision-problem condition, an attempt was made to explain how a major decision-problem may consist of subsets of decision-problem conditions composing different condition sequences. In addition, the basic classical decision-tree model was modified to allow for the introduction of a series of characteristics that may be encountered in an analysis of a decision-problem state. The resulting hierarchical model reflects the unique attributes of the decision-problem state. The basic model of a decision-problem condition was used as a base to evolve a more complex model that is more representative of the decision-problem state and may be used to initiate research on decision-problem states.

N80-22985/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Problem Solving and Decisionmaking: An Integration.
D. L. Dieterly. Apr 80, 20p NASA-TM-81191, AFHRL/H80-103
Prepared in Cooperation with Air Force Human Resources Lab., Moffett Field, Calif.

An attempt was made to redress a critical fault of decisionmaking and problem solving research-a lack of a standard method to classify problem or decision states or conditions. A basic model was identified and expanded to indicate a possible taxonomy of conditions which may be used in reviewing previous research or for systematically pursuing new research designs. A generalization of the basic conditions was then made to indicate that the conditions are essentially the same for both concepts, problem solving and decisionmaking.

PB80-174451 PC **A03**/MF **A01**
Missouri Univ.-Columbia. Dept. of Psychology.
Emotional Effects of Televised Violence.
Final project rept. 1 Sep 76-30 Aug 78,
Russell G. Geen. 30 Nov 78, 39p NSF/RA-780699
Grant NSF-APR76-20923

A series of experiments was conducted to test for possible effects of TV violence on emotions and verbal-attitudinal behavior motivated by emotional reactions. In three of these studies, some support was found for the hypothesis that exposure to TV violence set in a realistic contemporary urban setting can elicit emotional arousal attributable to socially-conditioned fear.

PB80-177165 PC **A11**/MF **A01**
Applied Communication Research, Inc., Stanford, CA.
Towards Usable User Studies: Assessing the Information Behavior of Scientists and Engineers.
Final rept.,
Colin K. Mick, Georg N. Lindsey, Daniel Callahan, and Frederick Spielberg. Dec 79, 230p
NSF/IST-78-10531F
Grant NSF-IST78-10531

The report describes a secondary analysis of data describing the information-related attitudes and behaviors of scientists and engineers in terms of their organizational and situational attributes. The database represented the responses of some 560 scientists and engineers who responded to a 600+ item questionnaire. Some descriptive analysis of the database is provided, however the bulk of the report deals with the development and testing of models to describe individual information-related attitudes and behaviors and the impact on these behaviors of organizational setting, job type, function and task. A meta-level model identified various levels of actionable variables which affect information behavior. An operational version of the model was developed to test relationships between these variables. Tests of the model indicate that external variables--environment, job, function, and task are significant predictors of information-related attitudes and behaviors.

PB80-177694 PC **A19**/MF **A01**
Washington Univ., St. Louis, MO. Dept. of Psychiatry.
The Social Consequences of Psychiatric Illness,
Lee N. Robins, Paula J. Clayton, and John K. Wing. Aug 79, 441p NIMH-80/04
Grant PHS-NIMH-282-78-0146-FS

The report contains papers on the general subject of the social consequences of psychiatric illness from the 1978 meeting of the World Psychiatric Association's Section of Epidemiology and Community Psychiatry. The subjects of these papers range from the costs and benefits of psychiatric care to the demand for medical services by persons under psychiatric care. Included also are papers on the interaction of psychiatric disorder, life stress and interpersonal relations, and papers on the interaction of social factors as both antecedents and consequences of mental disorder.

PB80-179054 PC **A03**/MF **A01**
Maryland Univ., College Park. Fire Protection Curriculum.
An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incident at the Taylor House on April 11, 1979.
Final rept.,
J. L. Bryan, J. A. Milke, and P. J. DiNenno. Apr 80, 42p NBS-GCR-80-200
Grant NBS-7-9014
Sponsored in part by Department of Health, Education, and Welfare, Washington, DC.

This fire incident originated on a sofa in the first floor lounge of the duplex unit at 1715 Lamont Street, N.W. Washington, D.C. on April 11, 1979. The duplex dwelling at 1715-17 Lamont Street, was known as the Taylor House and operated as a Community Residence Facility for fifty-one psychiatric residents on an out-patient status from St. Elizabeth's Hospital. At the time of the fire incident, there were a total of 26 residents in the 1717 duplex unit which received only light smoke damage. There were a total of 21 residents in the 1715 duplex unit, with two staff members at the time of the fire incident. The fire department personnel evacuated and rescued 7 residents from the building. There were a total of ten resident fatalities, and five residents suffered injuries requiring hospital treatment.

PB80-180615 PC **A05**/MF **A01**
Ohio State Univ. Research Foundation, Columbus.
Evaluation of Birch's Community Analysis Model (CAM) in NSF-RANN Regional Environmental Systems Products. Volume I.
Final rept. 15 Aug 77-31 Aug 79,
Oscar Fisch, Steven I. Gordon, R. Given, and H. D. Trotman. Aug 79, 93p NSF/RA-790381
Grant NSF-ENV77-15020

Birch's Community Analysis Model (CAM) is an ambitious attempt to model the microbehavior of different classes of the population in urban neighborhoods, mainly in terms of residential choice by location, by tenure, and by price of housing. The core of the CAM model is made up of the socio-

demographic and housing submodels. This report evaluates the workings of these critical segments of the CAM model.

PB80-181209 PC **A12**/MF **A01**
UniWorld Group, Inc., Bethesda, MD.
Consumer Reactions to Four Prototype Patient Package Inserts for Estrogens: A Focus Group Analysis. Volume I: Summary Analysis.
Final rept.,
L. Morris, S. Morris, J. Guerin, and A. Myers. Jul 79, 263p FDA/BD-80/6
Contract FDA-223-78-3010
See also report dated Feb 80, PB80-181449.

The report covers focus group discussions conducted by the Uniworld Group for FDA regarding four versions of estrogens PPIs. Volume I contains the major observations and key points made by the focus group participants. Topics covered in the sessions were overall concepts of PPIs in general and their initial reactions to the specific PPI discussed in the group (physical characteristics, format, tone, readability, level of detail, general content). The report covers these topics relating to each of the four different PPIs, then provides a synopsis of the group discussions based on each topic area. Volume II contains the slightly edited transcripts of the four focus group sessions. Participant profiles are included.

PB80-181449 PC **A09**/MF **A01**
UniWorld Group, Inc., Bethesda, MD.
Consumer Reactions to Prototype Patient Package Inserts for Prescription Drugs: A Focus Group Analysis.
Final rept. Sep 78-Feb 80,
A. Myers, S. Morris, L. Morris, and J. Guerin. Feb 80, 179p FDA/BD-80/54
Contract FDA-223-78-3010
See also Volumes 1 thru 3, PB-296 361, and Volume 2, PB80-181204.

The report covers 32 focus groups sessions conducted by the Uniworld Group for FDA. Drugs covered in these sessions were diazepam, erthromycin, estrogens and flurazepam (Dalmane). This volume covers the key points and observations made during these sessions regarding content, tone, format, complexity of writing, level of detail and organization of each specific document. For more details regarding each session, copy of the transcripts and participant profiles, refer to individual reports.

PB80-181654 PC **A03**/MF **A01**
Maryland Univ., College Park. Fire Protection Curriculum.
An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incident at the Harford Memorial Hospital on March 9, 1978,
John L. Bryan, and Philip J. DiNenno. 31 Jul 78, 47p NBS-GCR-80-209
Grant NBS-7-9014

The fire incident at the Harford Memorial Hospital on March 9, 1978 was detected by the nursing staff in response to a patient's cries at approximately 0315 hours. The four nursing staff members upon entering patient room 373 observed the linen involved for an area of approximately 1.5 square feet and flames with a height of approximately 1 foot adjacent to the patient. The facility has a capacity of 289 patients and at the time of the fire incident 279 patients were registered. The building containing the patient areas is approximately eight years old and of fire resistive construction. Upon observing the fire, two of the nursing staff immediately removed the patient while the other two pulled the flaming linen on the floor and extinguished the fire with a 2-1/2 gallon labelled pressurized water extinguisher. The door to room 373 was closed; the hospital security notified; the patient placed in another room; and other patients reassured. The facility local alarm system was not activated; the facility emergency procedures were not initiated; and the fire department was not notified.

PB80-181787 PC **A02**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Cooperative Marketing and Purchasing Div.
A Guide to Survey Research for Local Cooperative Management.
Cooperative information rept.,
Julie A. Hogeland. Apr 80, 20p CIR-24

The pamphlet is intended to aid cooperative managers who want to survey patrons of other groups on issues facing a cooperative. Cooperatives cannot be successfully operated unless managers recognize the concerns which are uppermost in the minds of patrons. Knowledge of their preferences, perceptions, and expected behavior can reduce uncertainty for both the manager and the board of directors. This information can help identify operations of the cooperative which are successful and merit expansion, as well as those which need to be corrected. A cooperative may need to relocate, add new facilities such as a feed mill, or do bulk spreading of lime. In each of these situations, questionnaires and interviews, the tools of survey research, can provide information to ease decisionmaking.

PB80-183270 PC **A14**/MF **A01**
New York Medical Coll., NY. Brian Research Labs.
Early Detection and Diagnosis of Potential Learning Disabilities.
Final rept.,
E. Roy John. 1976, 323p NSF/RA-761793
Grant NSF-ERP72-0349A
Continuation of Grant NSF-GI-34946.

The project responds to extensive evidence that electrophysiological measures have the potential capability to provide a means for accurate and objective differential diagnosis of a variety of important, presently inaccessible types of brain function. Main goals were: (1) to develop an automatic digital computer system capable of acquisition of electrophysiological data of excellent technical quality without the need for highly trained personnel; (2) to develop a battery of computer-administered tests which would provide estimates of a spectrum of brain functions related to sensory, perceptual, and cognitive processes; (3) to devise ways for the computer to generate data tapes containing a sufficiently detailed, encoded protocol so that the subsequent analysis would be automatic, requiring minimum operator intervention; (4) to develop analytic methods which would reduce the voluminous qualitative data yielded by this electrophysiological test battery to derived numbers representing its essential features and amenable to treatment by multivariate statistical methods; and (5) to apply this new technology to the study of a sufficiently large sample of normal and learning disabled (LD) children. Main segments of the text are devoted to the following topics: analyses of the EEG conditions contained in the neurometric test battery and their relation to psychometric indices; evoked potential conditions; overview of major differences between normal and LD groups on the NB; multivariate analyses; and infants' quantitative electrophysiological evaluation.

5K. Sociology

AD-A083 657/7 PC **A06**/MF **A01**
Forecasting International Ltd Arlington VA
An Assessment of the Influence of Emerging Social and Economic Trends on the People and Management of the Coast Guard. Volume I.
Final rept. Sep 78-Dec 79,
M. J. Cetron, E. F. Bishop, C. F. McFadden, and S. E. Sugarek. Dec 79, 121p USCG-D-14-80-VOL-1
Contract DOT-CG-827240-A
See also Volume 2, AD-A083 756.

The objective of this project is to explore the impacts of the emerging social and economic trends and events that are most likely to affect the people and management of the United States Coast Guard during the time period 1979 to 2004. The study utilizes two computerized models, KSIM and Cross-Impact, to develop projections of fifteen representative trends and 22 events. Cross-relevance and cross-support analyses are then utilized to assess the impact of these forecasts on critical components of the four major Coast Guard resource management areas: manpower, funds, material and information. The critical elements represent those points at which a change in the external environment or an internal policy, procedure or system could alter the resource flow pattern. Areas appropriate for policy action, either to take advantage of an opportunity or to address a potential problem, are identified and the appropriate action option formulated for each. (Author)

AD-A083 756/7 MF **A01**
Forecasting International Ltd Arlington VA
An Assessment of the Influence of Emerging Social and Economic Trends on the People and Management of the Coast Guard. Volume II.
Final rept. Sep 78-Dec 79,
M. J. Cetron, E. F. Bishop, C. F. McFadden, and S. E. Sugarek. Dec 79, 106p USCG-D-14-80-VOL-2
Contract DOT-CG-827240-A
See also Volume 1, AD-A083 657.
Availability: Microfiche copies only.

The objective of this project is to explore the impacts of the emerging social and economic trends and events that are most likely to affect the people and management of the United States Coast Guard during the time period 1979 to 2004. The study utilizes two computerized models, KSIM and Cross-Impact, to develop projections of fifteen representative trends and 22 events. Cross-relevance and cross-support analyses are then utilized to assess the impact of these forecasts on critical components of the four major Coast Guard resource management areas: manpower, funds, material and information. The critical elements represent those points at which a change in the external environment or an internal policy, procedure or system could alter the resource flow pattern. Areas appropriate for policy action, either to take advantage of an opportunity or to address a potential problem, are identified and the appropriate action option formulated for each. (Author)

AD-A083 980/3 PC **A04**/MF **A01**
Rochester Univ NY Management Research Center
Work and Organizational Life in the Year 2000.
Technical rept.,
Bernard M. Bass, and Edward C. Ryterband. Dec 72, 67p Rept no. TR-52
Contract N00014-67-A-0398-0012
Prepared in cooperation with Hay (E. N.) and Associates, Philadelphia, PA.

Some social, economic and political trends will be of consequence to work and organizational life in the future. We propose to examine the consequences to work and organizational life of these trends which include, growing urbanization, the population explosion, the continued burgeoning of the electronic data processing industry, the growth of mass communications and mass media, the civil rights revolution in the 1950's and 1960's, the expansion of business interests into overseas markets, changes in management philosophies, a growing number of corporate mergers, the expanding influence of the government in private industry, and changes in basic individual values. We will discuss systematically what we see is most likely to happen in the future world of work. We will look at the individual in an organization of the year 2000, his motivations for working, the rewards he receives, and his attitudes toward work. We will try to forecast what interpersonal relationships will be like in the organization of the future. We will suggest what we think communications, authority structures, work group functioning and formal organizations will look like in 2000 A.D. Finally, we will try to speculate on what it will be like to manage a productive organization of the future and ask whether conflict or the way it is managed will be any different from what it is now. We will look at how we think decisions will be made and how the problems of growth and change and management development will be handled.

AD-A083 981/1 PC **A03**/MF **A01**
Rochester Univ NY Management Research Center
Organizational Perspectives Wrought by Current Social Change.
Technical rept.,
Edward C. Ryterband, and Bernard M. Bass. Dec 72, 41p Rept no. TR-53
Contract N00014-67-A-0398-0012
Prepared in cooperation with Hay (E.N.) and Associates, Philadelphia, PA.

This report concerns how social, economic and technological changes will continue to affect the nature and meaning of work in our society. Al-

ready, automation has arisen as a consequence of our persistent drives for more efficient ways of doing work and our expanding technological capabilities. Its emergence has, in time, changed the complexion of the labor force. Fewer workers are involved in processing and production of goods and more are involved in service occupations. For example, proportions of assembly line workers and miners show continuing declines coupled with steady increases in physicians' assistants and teachers in the health professions. Many other trends, now underway, will have pronounced effects on the world of work. The most important of these trends include: population growth, continuing technological change, a revolution of rising expectations, continuation of the so-called generation gap, changing popular culture, and death and/or decline of traditional institutions. Each of these trends and their implications for changes in the nature, meaning and institutions of the world of work are discussed.

ED-175 400 Not available NTIS
National Rehabilitation Information Center, Washington, DC.
Proceedings of the Rehabilitation Information Network Conference, June 8/9, 1978, in Washington, DC.
Jun 78, 256p
Grant RSA-22-59137
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210.

This report of a conference cosponsored by the National Rehabilitation Information Center and the Clearinghouse on the Handicapped provides background on the need for a network system to make effective use of the Rehabilitation Services Administration (RSA) funded information services, defines and explains networking concepts and terminology, and describes representative information activities of future network members. Transcripts of presentations propose and provide supporting information for a Rehabilitation Information Network, with particular attention given to an explanation of the structure and services of the National Rehabilitation Information Center (NARIC). A directory of rehabilitation information resources focuses on the information activities of organizations represented at the conference, with information on services available, user groups, and contact information. Appendices include a resolution to support a rehabilitation network, the conference agenda, and a list of attendees.

PAT-APPL-6-126 591 PC **A02**/MF **A01**
Department of Commerce, Washington, DC.
Handcuff Improvements.
Patent Application,
James E. Harris. Filed 3 Mar 80, 16p PB80-184070
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Triple locking handcuffs are provided having a lock which has an abutment therein which pushes against a bolt in the lock to double lock the latch and triple lock the ratchet and pawl of the lock. In the triple locked position a biasing means forces the bolt against the abutment, and to unlock the handcuffs a number of different mechanical means are provided for moving the bolt slightly away from the abutment, whereupon the ordinary handcuff key can be used to unlock the handcuffs. Handcuffs are also provided which automatically double and triple lock upon application to the wrist.

PB80-172380 PC **A99**/MF **A01**
RAND Corp., Santa Monica, CA.
Codebook for the Survey of Landlords, Site I, Wave 2. Housing Assistance Supply Experiment.
Patricia Boren. Jun 79, 659p HUD-0000819
Contract HUD-H-1789

This is the codebook for the second ('wave 2') survey of landlords conducted in Brown County, Wis., from April through September 1975, as part of the Housing Assistance Supply Experiment. It reproduces each question in the survey instrument and its related forms, lists all permissible responses, and annotates each question with interpretations promulgated during training, field operations, editing, and subsequent data processing. It also includes marginals, tabulations of the 1,361 panel survey records that constitute the preliminary master file for the survey. The file includes one record for each survey panel property that was rented for all or part of 1974. Interviews were sought with all present owners and also with previous owners if the property had changed hands since the baseline survey. There were 1,106 completed interviews and 54 properties which were no longer rental housing units. Generally, the questions cover mode of acquisition of the property, real estate experience of the owner, age and use of the building, income derived, expenses, repairs and improvements, mortgages, taxes, insurance, relationships with tenants, neighborhood characteristics, plans for the property, and attitudes towards the housing allowance program.

PB80-172398 PC **A05**/MF **A01**
RAND Corp., Santa Monica, CA.
Topical Guide to Housing Assistance Supply Experiment (HASE) Research.
Ira S. Lowry. Jun 79, 90p HUD-0000820
Contract HUD-H-1789

To help prospective authors who are preparing a series of eight evaluation papers on Experimental Housing Allowance Research, this guide to the Housing Assistance Supply Experiment (HASE) has been prepared. The total Experimental Housing Allowance Program (EHAP) has four components: the Demand Experiment, HASE, the Administrative Agency Experiment, and the Integrated Analysis. Fieldwork is now complete for all except HASE, which has a 10 - year lifespan, 5 of which will be monitored. Because the HASE reports are cumulative and organized differently from the topical divisions specified for the evaluation papers, data needed are scattered through many reports. This guide presents a brief summary of findings relevant to each of the evaluation themes, then lists documents which should be consulted. The following topics are covered: critique of the EHAP design, policy implications of EHAP, participation of eligible households, mobility and search behavior, other household behavior, market effects of EHAP, administrative lessons from EHAP, and a universal housing allowance program. A topical index of all HASE documents published before March 31, 1979, is appended. Some of the documents cited in the text were due for publication during the summer of 1979.

PB80-172422 PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
Audit of the Household Attitude Survey, Site II, Wave 2. Housing Assistance Supply Experiment.
Marsha Baran. Jul 79, 42p HUD-0000828
Contract HUD-H-1789

Methodology and results are reported regarding the audit of data collected on community attitudes toward housing assistance in the second - wave survey of households in St. Joseph County, Ind., from January through July 1976. The audit assessed the completeness and reliability of the data on community attitudes toward the housing allowance program and led to modifications in field methods and data preparation for later surveys. The audit involved searching for coding and cleaning errors, assessing potential biases due to nonresponse and unequal sex distribution of respondents in joint - headed households, documenting changes made to the codes by which verbatim responses were converted to machine - readable form, and checking for evidence of problems in the survey instrument, interviewer training, field procedures, or survey data preparation that might affect the quality or interpretation of the data. The audit showed that interviewers did not always understand the allowance program well enough to determine whether respondents were knowledgeable. Data were sometimes missing or inapplicable as a result. Interviewers should be better informed about the allowance program and be given further training in nondirective probing to elicit clearer answers from respondents. The chief recommendation concerns the audit itself. Subsequent audits should confine error checks to the field - complete records, increasing efficiency without impairing the audit's contribution to research. The appendix contains supplementary tables.

PB80-172539 PC **A07**/MF **A01**
Notre Dame Univ., IN. Inst. for Urban Studies.
Survey of Neighborhood Identification Approaches.
Thomas Broden, John Roos, Ron Kirkwood, Susan Roberts, and Joseph Smiley. 1977, 150p HUD-0000849

As the first stage of a process to produce a guide for neighborhood identification that cities can use during the 1980 census, this report is primarily descriptive. It contains information obtained in a survey of both scholarly literature and of 65 cities across the country on perceptions of neighborhood boundaries and methods for defining them. The literature summary, to be read in conjunction with the collection of abstracts of salient articles and books, lists eight major approaches accepted by academics: human ecology, social bonding, political, functional, physical, perceptual / phenomenological, economic, and practical. Each approach description includes examples of representative authors. The city survey summary, followed by alphabetically arranged profiles of all responding cities, shows that cities are engaging in the process of neighborhood identification with little interaction, and many have proceeded with some form of neighborhood definition without thinking through the function and purpose of such subdivision. Overall, the results of both surveys indicate that cities are intensively interested in the process of neighborhood definition and that the 1970 census tracts are not appropriate units of analysis for neighborhood planning and development. These tracts often bisect agreed - upon neighborhoods and generally indicate areas that are smaller than actual perceived neighborhoods. Multiple criteria should be used to define neighborhood boundaries including the criteria of physical boundaries, and residents' perceptions of neighborhoods should be solicited. Once a single definition of a neighborhood is established, it should be used uniformly and consistently by HUD and by all U.S. cities. A bibliography is appended.

PB80-172554 PC **A02**/MF **A01**
Department of Housing and Urban Development, San Francisco, CA. Office of Program Planning and Evaluation.
Minority Contractors Involvement in Repair Contracts.
Evaluation memo.
Jun 75, 18p HUD-0000852

The low level of minority contractor (MC) involvement in HUD's home repair contracts in the San Francisco area is studied. Interviews were conducted with 20 minority contractors and a number of involved government officials; in addition, contractor rosters and contract awards from the San Francisco Office of HUD were examined. The period covered was July 1 - December 31, 1974, the first reporting period under the July 1 Federal minority contractor goals program requiring each HUD area to develop goals for awarding contracts to MC's. The 12.2 percent of total contracts awarded to MC's did not exceed preprogram figures. In addition, required program outreach efforts have been minimally implemented, and efforts by agencies such as the Office of Minority Business Enterprises have not contributed to contractor participation. Perceived, subtle racial discrimination and difficulties in understanding HUD processes contribute to lack of MC participation in the goals program. In addition, procedures that designate areas in which contractors can bid, package three to four houses into one contract, form a list of bidders for a contract at one time, or require that contractors be bonded, prevent many MC's from bidding or receiving contracts. In addition, since MC firms are small, they need technical assistance. Recommendations are (1) that the San Francisco Office increase the usefulness to MC's of bidders' lists, broaden knowledge of bidding opportunities, and pay for work faster; and (2) that HUD ensure that its staffs provide technical assistance, advocacy, preference for certain jobs, and an adequate work flow, to MC's.

PB80-172570 PC **A12**/MF **A01**
Boeing Co., Seattle, WA. Community Development Organization.
Design and Development of Housing Systems for Operation Breakthrough. Phase I.
David C. Kirkman, and Enrique K. Muller. 1973, 257p HUD-0000854, HUD/RT-2B

This document is a compendium of the 22 housing systems designed for Operation Breakthrough

(OB), a research and technology program sponsored by HUD. The report covers the design, during phase I, of the 22 housing systems and is intended to be a general report, useful for builders, developers, and homeowners. High quality, innovative housing systems suitable for volume production are the technological foundation of OB, which seeks better ways to build new houses by adding the dimension of industrialized housing, testing innovative ideas and materials, and improving marketing and standards. To date, designs successfully completed through these specified housing systems producers range from split - level to high - rise homes and use wood, concrete, metal, and plastic building materials. The result is housing with marked distinction but uniform quality, over a wide price range. Administration of the program is the responsibility of HUD; State and local governments nominated the prototype sites and industry provided the housing system producers. Contracts were awarded through bid procedures. Performance criteria and testing procedures and standards are discussed. In addition, the 22 housing systems producers' works are detailed. Information on system applicability, building system descriptions, departures from conventional systems, production of programs, labor requirements, economics, and marketing is presented. Photographs, diagrams, and an appendix are included.

PB80-172596 PC **A13**/MF **A01**
Minneapolis Arts Commission, MN.
Minneapolis Warehouse Artist Living/Working Space Project.
1979, 295p HUD-0000857
Sponsored in part by McKnight Foundation, Minneapolis, MN., Minnesota State Arts Board, Minneapolis, MN., and National Endowment for the Arts, Washington, DC.

The result of a year - long study conducted by the Minneapolis Arts Commission (Minnesota), this report is the first comprehensive examination of artist housing in converted buildings in the United States. The Warehouse Artist Living / Working Space Project examined buildings in the downtown Minneapolis warehouse district to determine how vacant and underutilized warehouse buildings could be converted to artist studio / living space, in compliance with zoning and building code requirements, and remain affordable for low - and moderate - income artists. Initially, 80 buildings in the district were surveyed and 5 were selected for detailed analysis in terms of condition and structure, history, and location. Case studies for each building contain proposals for the reuse of the buildings and descriptions of interior demolition, code compliance, energy improvements, and unit development. To obtain a general understanding of the nature of the improvements required and estimated costs, design drawings of the study buildings are included, as are specific improvements for conversion of other buildings to living / studio uses, price information, and code references. Although it is unlikely that affordable space can be created without major subsidy from a public or private source, a variety of financing approaches are identified and explained. Income tax incentives may be valuable in reducing development costs if the investors are in an upper tax bracket and desire to limit their tax liability. Also, real estate tax incentives, in the form of abatement or exemption, and government financing programs are possibilities. A detailed economic analysis of annual occupancy costs is provided. To ensure that artists will be able to exert long - term control over these spaces, the report examines certain legal considerations, such as a system of ongoing incentives to developers, standard ownership forms (e.g., fee simple), and collective forms of ownership (condominium or cooperative). Diagrams, footnotes, and tabular data are included, with supporting data appended.

PB80-172653 MF **A01**
Urban Research and Development Corp., Bethlehem, PA.
Guidelines for Improving the Mobile Home Living Environment: Individual Sites, Mobile Home Parks and Subdivisions.
Aug 77, 102p HUD-0000866, HUD/PDR-305
Contract HUD-H-2634
Paper copy available from the Sup. of Docs., Stock number 023-000-00459-3.

This study examines the problems and needs of the mobile home community and provides guidelines for improving the mobile home living environment throughout the U.S. Currently, 3.4 million year - round mobile homes exist nationwide, representing 96 percent of all new housing available for under $20,000. Due to the significance of mobile homes in the country's total housing picture, the following major constraints against the acceptance of mobile homes must be addressed: many communities continue to view mobile homes as a blight on the local environment and often enact legislation to prohibit or isolate them; mobile home builders remain unwilling to incorporate features to improve the environment of mobile homes because of unknown or increased development and maintenance costs; and planners, designers, engineers, and government personnel and agencies have not promoted or utilized standards which can improve the mobile home environment. Some recommendations to improve this situation include locating mobile home sites, parks, or subdivisions in areas of compatible land use and surrounding environments, in areas with adequate utility and road support systems, in areas with reasonable convenience to community facilities, and in areas of similar density. For individual mobile home lots and mobile home group settings, techniques are described for creating privacy, protecting the view from the home and lot, controlling the climate, and improving the attractiveness of the environment. The design recommendations to improve mobile home living environments are made with cost considerations in mind. Appropriate unit costs and costs per mobile home lot are included, where applicable. In addition, an evaluation method containing three major categories (location, individual mobile home lot, and group mobile home setting) for mobile home living is presented as a guide for Federal, State, or local jurisdictions in evaluating mobile home environment or for designers, developers, and prospective mobile home residents in determining features which are important for improving mobile home living. A model ordinance is also provided for State and local governments in preparing their own ordinances, and directions for specific actions are included. Selected references, illustrations, graphs, and charts are presented.

PB80-172661 PC **A08**/MF **A01**
Naramore, Bain, Brady and Johanson, Seattle, WA.
Study of Housing Requirements of Alaskan Natives.
Final rept.
Jul 77, 160p HUD-0000867
Contract HUD-H-2319

This report presents the results of HUD's second and final stage of a study on housing requirements for Alaskan natives. Although the salient findings of previous reports are repeated, the purposes of this phase were to (1) develop a system of communications to ensure Alaskan native participation in planning and design, and (2) determine the need for possible program modifications, new Federal programs, and legislative recommendations. Out of hundreds of personal interviews, thousands of data inputs, hours of research on previous studies, and extensive travel, the study identified several problem areas affecting current progress: the volume and diversity of need, the lack of response by existing programs and products to this need, and the lack of coordination of programs and agencies involved in the delivery process. This phase further examines the existing situation, problems, alternative solutions, and recommendations related to administration, finance, planning, production, and management of a housing program for Alaska. Legislative and cost impacts are also discussed. Overall recommendations point out the need to increase local participation in the housing delivery process, consolidate and simplify agency responsibilities related to housing delivery, assist local governments and State agencies in becoming more active in stimulating the private housing market, and establish a system of priorities for the delivery of housing to regional centers and villages. An appendix contains housing needs approximations and related discussions (with footnotes). Tabular data, charts, and illustrations are also included.

PB80-172687 PC **A03**/MF **A01**
Denver Univ., CO.
Public Administration Field Service Program for Energy-Impacted Communities. Housing Development Planning Project: Rangely, Colorado.
Project rept.,
Richard Graczyk. May 78, 40p HUD-0000869

An intern in the HUD - sponsored Public Administration Field Service Program reports on his experiences in and recommendations for Rangely, Colo., a town forced into rapid expansion associated with coal mining, power production, and oil shale development. The focus is on alleviating Rangely's housing shortage. After World War II, an oil field was discovered there and exploited. During this period, village - type housing was built to accommodate new population growth, but it has since become dilapidated and abandoned. Efforts to improve, repair, and replace this and other housing are hampered by the excessively high cost of land and materials as well as the serious shortage of both. Rangely has applied for the transfer of 2,500 acres of Bureau of Land Management land on the developable mesas south of the town, but the transfer is delayed in paperwork. Four options were developed for Rangely by the author and assisting consultants. These include (1) energy company participation, ranging from complete company financing of badly needed housing development to landbanking in order to keep land costs free from escalation; (2) freezing the assessment level of a parcel of undeveloped land until after development and then issuing tax increment bonds to be paid off by revenue from the increased assessment (the money would finance necessary infrastructure on the development site); (3) use of a 90 - percent loan guarantee of the Farmer's Home Administration Business and Industrial Loan Guarantee Program to cover part of the bank risk; and (4) probably most promising, the creation of a housing authority with the power to issue Industrial Revenue Bonds. Advantages of the options, detailed proposals and figures concerning the options, and related materials are provided.

PB80-172695 MF **A01**
National Inst. of Law Enforcement and Criminal Justice, Washington, DC.
Design for Safe Neighborhoods. The Environmental Security Planning and Design Process.
Richard A. Gardiner. Sep 78, 83p HUD-0000870
Paper copy available from the Sup. of Docs., Stock number 027-000-00751-1.

Environmental security design is based on the concept of territoriality -- a protective feeling fostered in those who live in or work in an area. Territoriality assumes that persons will feel potentially threatened by the intrusion of strangers and will be willing to act on that perception. It also assumes that potential offenders will perceive that they are intruding on the domain of others and will be noticed. This feeling can be fostered by design elements which restrict areas for the exclusive use of residents and invited persons, group entrances and access ways so that those who use them regularly are known to others, and reduce visual barriers. Environmental security design also reduces hiding places for offenders and makes leaving the area difficult. Maps illustrate the theories of territoriality and its application to reduce residential burglary, auto thefts, street robberies, and muggings. The first step is data collection. Often, plotting the place of occurrence and the circumstances surrounding crimes will suggest design changes. A section of the manual charts the environmental design process and suggests ways such a project might be organized, funded, and applied. Finally, successful projects in Hartford, Conn., the South Loop New Town of Chicago, Ill., Oak Park, Ill., and St. Louis, Mo., are described. Drawings, maps, and references are included.

PB80-172836 MF **A01**
Johnson (Lawrence) and Associates, Inc., Washington, DC.
Citizen Participation in Community Development: A Catalog of Local Approaches.
John Straub, David Merriman, Joseph Miller, and Frederick Stinson. Jul 78, 167p HUD-0000890, HUD/PDR-348
Contract HUD-H-2542
Paper copy available from the Sup. of Docs., Stock number 023-000-00478-0.

This catalog presents descriptions of innovative and noteworthy citizen participation processes in

the Community Development Block Grant (CDBG) Program in 31 communities (27 cities and 4 counties). Each description includes three sections: a brief background on citizen participation in the community prior to the beginning of the CDBG Program, the procedures and structures used to implement citizen participation in the program, and exemplary aspects of the citizen participation process. This catalog is intended to help local officials involve citizens in the allocation, implementation, and monitoring of Federal CDBG funds in their communities. It is also intended to help citizens and citizen organizations take an active role in improving their neighborhoods and communities. The descriptions of citizen participation processes in the 27 cities are organized on the basis of population size, although there are a variety of other factors to consider in the development of an effective citizen participation process. In order to implement citizen participation, the communities described in the catalog developed strategies for hearing and incorporating citizen ideas and opinions. The structural components of the 31 communities vary widely, both in the level at which the structures are organized (communitywide, district, or neighborhood) and in the lines and scope of responsibility among the various levels. The state of existing citizen and neighborhood organizations in the community at the beginning of the CDBG Program was an important factor for communities in developing a citizen participation strategy. The existing organizations and institutions had to be assessed in regard to decisions about how to build upon or modify them. Some communities, such as Asheville, N.C., decided not to use them at all. Besides the descriptions of citizen participation in the various communities, tables describe characteristics of citizen participation structures, city - level bodies, neighborhood organizations, intermediate - level bodies, and citizen participation in urban counties. Also listed are techniques used to encourage citizen participation. Appendices contain information on socioeconomic characteristics of the cities, sources of data used in the catalog, methodology for the study, an annotated bibliography on citizen participation, and a glossary. An index is also provided.

PB80-172844 PC **A04**/MF **A01**
Colorado Univ., Boulder.
Public Administration Field Service Program for Energy-Impacted Communities. Economic Diversification Project: Business Community Survey, Carbondale, Colorado.
Project rept.,
Margaret Vetter. Sep 78, 60p HUD-0000891

This report analyzes the results of a business community survey for the Town of Carbondale, Colo., as a first step in lessening its economic dependency on the mining industry and creating a more diversified economy. Students and faculty from the University of Colorado, under the Public Administration Field Service Program for Energy - Impacted Communities, offered technical help. Results from the 77 questionnaires returned showed that (1) respondents felt the most important economic planning issues were the preservation of the small - town character, development of the older business core, and promotion of tourism; (2) most businesses were individually owned and had less than five employees, except for the finance, real estate, and insurance sector; (3) owners felt optimistic about increased business activity; and (4) respondents felt that restaurants and a discount store were needed. Further studies are necessary to define the extent and potential of present tourism, size of a trade area, and the extent of a potential labor force. Notes and four appendices with energy - impact and business inventory information, questionnaire responses, and a community profile are attached.

PB80-172893 PC **A02**/MF **A01**
Southern Research Inst., Birmingham, AL.
Easy Guide to Mutual Help Homeownership Opportunity Housing Program for Indians,
Pearl Tropper, and Sheldon Schaffer. 31 Mar 76, 9p HUD-0000896
Contract HUD-H-1685

Arranged in a question and answer format, this guide provides information about the Mutual Help Housing Program for Indians. The program was developed by an Indian housing authority to help low - income Indian families become homeowners. Families in one area join together to help build homes for all the families in the group. The value of each family's mutual contribution must be at least $1,500 and may be in the form of cash, land, labor, materials, or equipment. Part of the $1,500 may be contributed by the Indian tribe. The cost of the house will vary according to the geographic area and the size of the individual family. An Indian family may qualify for the program if its income is too low to pay for private housing in the area. The family also must be willing to sign a Mutual Help and Occupancy Agreement, a contract between the family and the housing authority. Details of the contract are explained as well as other concerns a family might have when considering this program. The goal of the program is to provide decent housing with the potential for homeownership in 25 years or less after joining the program.

PB80-172927 MF **A01**
National Council of Negro Women, Inc., Washington, DC.
Women and Housing. A Report on Sex Discrimination in Five American Cities.
Jun 75, 196p HUD-0000910, HUD/EO-126
Paper copy available from the Sup. of Docs., Stock number 023-000-00316-3.

To obtain a reference work on discrimination of women in the housing market, the Women and Housing Project was carried out under an agreement between the National Council of Negro Women (NCNW) and HUD from July 1974 through June 1975. The project also sought to encourage, at the local level, a continuing private sector thrust directed at eliminating discrimination based on sex in five major metropolitan areas -- Atlanta, Ga., St. Louis, Mo., San Antonio, Tex., San Francisco, Calif., and New York City. To accomplish these goals, an ad hoc Commission on Women and Housing established to push for expanded housing opportunities at the local level, conducted local field research to identify issues for public hearings and develop a background demographic profile on each city, conducted a local public hearing in each city to probe the nature and extent of sex discrimination in the housing market, and carried out a posthearing workshop to increase public awareness of sex discrimination in housing and to stimulate local efforts to resolve the problem. The project's findings indicate that women in the cities studied face discrimination on account of their sex in the areas of marketing, lending, and shelter - related services. Lack of equal rental opportunity represents an especially pressing problem. Historically, discrimination has been overt; today, it is increasingly subtle, hidden behind such superficially neutral criterion as marital status. Myths and stereotypes about women are the underpinning of prejudicial attitudes shared by both men and women in the housing system. In addition, neither public agencies nor private organizations maintain and compile statistics pertinent to women's access to shelter or housing - related services and facilities, or to the impediment of finding solutions to the problem as well as raising the level of public awareness. Other findings and recommendations are provided. Procedures and participants involved in conducting the project, statistical data for each city studied, and a list of resource publications and organizations for women are appended. A bibliography and reference notes are also included.

PB80-172968 PC **A02**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
Preliminary Findings from the Housing Allowance Demand Experiment,
James E. Wallace. Mar 78, 25p HUD-0000922
Contract HUD-H-2040R

First - year data show that a housing allowance can make housing more affordable for those already in adequate homes and facilitate housing improvement for those not already in adequate housing. A third of the enrollees in the Housing Gap plans already met minimum housing requirements. They were paying an average of 44 percent of their disposable income for rent, however. Allowance payments reduced this to 26 percent. Households which did not meet minimum housing requirements could receive allowances only if they upgraded their units or moved to acceptable housing. Only a third of this group met the housing requirements by the end of the year. Households in the control group, the unconstrained plan, did not have to meet minimum housing requirements and incurred program - induced rent increases of only 10 percent of the allowance payment, in contrast to 30 percent for all Housing Gap recipients. Most eligible households in the two experimental cities (Pittsburgh, Pa., and Phoenix, Ariz.) did not participate. Some refused to enroll, and others enrolled but did not meet the housing requirements during the first year. Since those at the upper level of the income range were more likely to live in adequate housing, it was easier for them to participate. Thus, the program tended to serve those with higher incomes. The rent rebate program showed that this type of subsidy resulted in a greater increase in housing expenditure than would a pure income transfer of the same amount. None of the plans had any effect on the desegregation of the poor and minorities. This review contains charts, footnotes, and appendices.

PB80-172976 PC **A05**/MF **A01**
Columbia Univ., New York. Center for the Social Sciences.
Longitudinal Transformation and Analysis of the Annual Housing Survey.
Final rept.,
Harold W. Watts, and James C. Wendt. 18 Jun 79, 83p HUD-0000925
Grant HUD-H-2844RG

Software for the longitudinal transformation of the Annual Housing Survey is described in this final report. The Longitudinal Transformation program is a package of programs designed to maintain and update the files as well as extract and merge selected records and variables for the Annual Housing Survey. The software includes five programs which can be used separately or in a series: (1) a Dictionary program which creates a separate dictionary file for each survey year, (2) a Master File of all control numbers which permits longitudinal files to be constructed that include in coded form the reasons for gaps in the information for particular years and which also can be used for sampling, (3) a Freeform program which reads the user - supplied request to begin defining an analysis file, (4) a Process program which reads input from the Freeform and Master programs, and (5) a Merge program. Flow charts and sample output forms illustrate the operation of each of these programs. A final section gives data specifications and illustrates the use of this package to develop analyses of the Annual Housing Survey Data.

PB80-173032 MF **A01**
Brill (William) Associates, Inc., Annapolis, MD.
Site Security Analysis Manual. Planning for Housing Security.
Jun 79, 33p HUD-0000950, HUD/PDR-461
Contract HUD-H-2249R
Paper copy available from the Sup. of Docs., Stock number 023-000-00533-6.

This manual, one of a series on comprehensive security planning, deals with the careful analysis of a site to identify any features that contribute to resident victimization or fear of crime, or cause residents to withdraw from their environment and from each other. It provides guidance on how to analyze a site systematically and prepare solutions based on that analysis. The six basic criteria that form the analysis framework include penetrability or how the site can be entered, territoriality or design features suggesting boundaries and security, opportunities for surveillance, unassigned space that can easily be claimed by intruders, design conflicts where groups are forced to compete for space, and influence of surrounding neighborhoods. Numerous examples are given in which the criteria were employed and solutions developed. A five - step process to conduct the analysis and to develop solutions is described, with detailed explanations given for each step. These include (1) preparation of the base map, (2) organizing the site security analysis, (3) administering the site security analysis, (4) developing design solutions, and (5) integrating site improvements into the comprehensive plan. Finally, design guidelines are presented that can be used to prepare the site improvements portion of a comprehensive security plan. The manual should be used in conjunction with the other manuals in the series. Figures are included.

PB80-173040 MF **A01**
American Institutes for Research, Washington, DC.

Crime in Public Housing. A Review of Major Issues and Selected Crime Reduction Strategies. Volume I: A Report,
W. Victor Rouse, and Herb Rubenstein. Dec 78, 104p HUD-0000955, HUD/PDR-468/1
Contract HUD-H-2855
Paper copy available from the Sup. of Docs., Stock number 023-000-00536-1.

This report, the first of two volumes, presents a literature review and analysis of crime prevention and control strategies. It is part of an ongoing assessment and policy development process concerned with problems in public housing. The strategies were primarily developed for public housing developments, but are applicable to private housing. Three categories of crime correlates relating to public housing -- physical factors, social factors, and selected policies of the government and of local public housing authority management -- combine to form one human environment. These factors consist of lack of surveillance, adequate locks, alarms, and adequate circulation patterns and transportation services and facilities (physical); lack of social organization, cohesion, and informal social control (social); and inadequate and unstable government funding for preventive measures, ineffective coordination and communication with local law enforcement agencies, and ineffective anticrime management policy (policy factors). Several integrated crime - reduction approaches as proposed by Newman, Gardiner, Brill, Rosenthal, and the Westinghouse National Issues Center, are reviewed. Then five criteria suggested in literature as important crime - reduction strategies are applied to these approaches. They include (1) use of data, mapping techniques, and systematic research methods; (2) treatment of social and physical factors; (3) use of citizens as a crime - prevention resource; (4) use of a substantively integrated approach; and (5) emphasis on responsibility among the key groups. Weaknesses in the proposed strategies are identified and further topics to be researched are listed. Tabular data are included.

PB80-173057 PC **A06**/MF **A01**
RAND Corp., Santa Monica, CA.
Housing Assistance Supply Experiment. Fifth Annual Report, October 1977-September 1978.
Jun 79, 106p HUD-0000975
Contract HUD-H-1789

This report describes the progress of the Housing Assistance Supply Experiment (HASE) during its fifth year of operations, October 1977 through September 1978. A full - scale housing allowance program has been mounted under Rand Corporation's supervision in two midwestern metropolitan areas in order to learn about the effects of such a program on local housing markets. At the end of September 1978, the experimental housing allowance program had operated for 51 months in Brown County, Wis., and 45 months in St. Joseph County, Ind. Altogether over 20,500 households had been enrolled in the 2 sites and nearly 16,300 had received 1 or more allowance payments. Currently, about 10,400 households are enrolled and over 8,700 are receiving monthly payments. In each site, current enrollees constitute 40 to 50 percent of all eligible households and about 8 percent of all households. The program has provided financial assistance to renters and homeowners. The average payment is $77 monthly and amounts to 20 percent of recipients' gross income. Their allowances mainly help meet existing housing expenses. Nearly 8,500 dwellings have been repaired or improved to meet program standards and about 4,400 households have improved their housing circumstances by moving. About 260 renters have purchased homes after enrolling in the program. The report reviews key program statistics for the two sites, noting trends and major developments, and summarizes progress in developing and analyzing data, but does not discuss research findings. The report also explains events leading to the first major revision of the HASE research charter and plans for completing the experiment in September 1981. Appendices list HASE publications, a chronology of major events in the program, organization of HASE and Rand's staff. Tabular data are included.

PB80-173107 PC **A03**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of Economic Affairs.
Movement of Blacks and Whites Between Central Cities and Suburbs in 11 Metropolitan Areas, 1955-1975,
Kathryn P. Nelson. May 78, 36p HUD-0000981

Data on movement of blacks and whites between 11 large cities and their suburbs, from HUD's 1974 and 1975 Annual Housing Surveys, are compared with 1960 and 1970 census data. Recent studies have spotlighted white, middle - class returns to central cities. Although it is welcomed, resettlement of displaced poor blacks has become a concern, as suburban ghettos could result. However, HUD's study indicates that the white return is small, promising neither speedy inner - city revitalization nor widespread displacement of the poor. There is more evidence of post - 1970 changes in black migration patterns, including the following (1) eight of the 11 cities studied show a net black emigration from the inner city; (2) in five cities, the above migration was accompanied by marked increases in black migration to the suburbs; and (3) in the remaining six inner cities, black emigration was well below white, although disparities between whites and blacks in the suburbs indicate that these areas are not yet equally accessible to both races. Although white populations have increased in the 11 cities since 1970, only Los Angeles shows sharp increases; whites in other cities seem merely to be moving out at a slower rate than in the past. However, young, white adults, 20 - 34, are moving into 7 of the 11 inner cities at above - average rates, and inner city retention of them is greater than among all other groups of whites combined. A bibliography, tables, footnotes, and a list of data sources are included.

PB80-173123 PC **A05**/MF **A01**
RAND Corp., Santa Monica, CA.
Public Perceptions of Housing Allowances: The First Two Years. Housing Assistance Supply Experiment,
Phyllis L. Ellickson, and David E. Kanouse. Sep 79, 94p HUD-0000985
Contract HUD-H-1789

Public awareness and expectations about the housing allowance program are examined for its first 2 years of operation in Brown County, Wis., and St. Joseph County, Ind. Data were collected from the attitude modules of the surveys of households and landlords, the observations of project resident site monitors, and from records of telephone calls received by each site's housing allowance office. The analysis shows that the allowance program has become an accepted institution in both experimental sites. Early controversies among community leaders about local participation appear to have receded without having gained the attention of the general public. Most residents know the program exists and view it either favorably or neutrally. Approval has grown with the spread of program recognition throughout the community. Landlords were initially less enthusiastic than the general public, and in St. Joseph County the number of landlords who disapprove has increased. The program fulfills most clients' expectations. Both clients and the general public drew sharp distinctions between the allowance program and 'welfare' programs, viewing allowance recipients more positively than those on welfare. Noting the contrasting perspectives of community officials and the general public in this matter, and appreciating that the views of ordinary citizens as well as civic leaders are often vital to the success of many programs, managers need to find ways to consult citizens directly. Features of the housing allowance program are described in the appendix, and a bibliography is provided.

PB80-173131 PC **A03**/MF **A01**
New Jersey County and Municipal Government Study Commission, Trenton.
Housing and Suburbs. Fiscal and Social Impact of Multifamily Development. Summary of Findings, Conclusions and Recommendations.
Executive summary,
Alan Mallach, and Stephen A. Decter. Jun 74, 27p HUD-0000987

Issues related to the development of multifamily housing in suburban areas of New Jersey are outlined in this summary of a report by the New Jersey County and Municipal Government Study Commission. Multifamily housing in New Jersey tends to mean either garden apartments or townhouses (high rise developments are a rarity and confined to a few communities). In the area of fiscal issues, findings are that (1) the multifamily development is often perceived as less favorable than it actually is; (2) most multifamily developments are fiscally more advantageous to a municipality and school district than are all but the most expensive single - family housing developments; (3) certain multifamily housing types, such as moderate - rent, three - bedroom apartments, are in themselves deficit producing; (4) expenditures increase as a result of increasing population and physical growth, with the type of housing having little effect on expenditure; and (5) the level of municipal expenditures per resident is primarily a function of community size and growth rate. Multifamily residents were found to contribute substantially to community social and political involvement. Recommendations include that State assistance be available for provision of municipal infrastructure and facilities and for municipal service operating deficits, and that standards of planning for residential development be established.

PB80-173149 PC **A13**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
Discrimination in Rural Housing: Case Studies and Analysis of Six Selected Markets. Volume II: Case Studies.
Aug 75, 290p HUD-0000988, HUD/PDR-116/2
Contract HUD-H-2150-R

Results are reported from a study aimed at identifying factors contributing to inequality in housing in rural communities in Arkansas, Georgia, New Mexico, North Carolina, South Dakota, and Tennessee. Data were obtained through interviews with builders, lenders, brokers, major landowners, mobile home dealers and park owners, town and county officials, leaders of community organizations concerned with housing, and others deemed to be important sources of information on housing market patterns. At the Arkansas site, a company town planned and built by the company which is still the leading employer and owner of virtually all developable land, racial segregation is complete, with the black community being unorganized and passive. Still, the site showed the highest level of housing quality and homeownership due to company involvement in housing. The Georgia site, a timber - producing area recently industrialized, had unchallenged residential segregation of blacks with very little market activity occurring. The New Mexico site showed no evidence of ethnic discrimination in housing, although the Spanish - surnamed population is disproportionately poor and has poorer housing conditions. The North Carolina site has a large black population with severely deteriorated housing. While blacks have organized to protest employment discrimination, housing - related problems have not yet received attention. The South Dakota site, partially covered by a Sioux Reservation, is the most economically depressed of all the areas. Indians suffer extreme poverty and poor housing conditions, both exacerbated by discrimination. The Tennessee site, with a long history of segregation and discrimination against blacks, has resisted all efforts to improve housing for blacks. Black community organization is just beginning and is currently focused on employment discrimination. Tabular data are provided.

PB80-173156 MF **A01**
California Univ., Santa Barbara. Social Process Research Inst.
Evaluating Measures of Neighborhood Quality in the Annual Housing Survey,
William T. Bielby. Mar 79, 33p HUD-0000989, HUD/PDR-470
Contract HUD-H-2513
Paper copy available from the Sup. of Docs., Stock number 023-000-00539-5.

An examination of the influence of neighborhoods, respondents' characteristics, and household attributes on responses to the 'neighborhood quality' items in the 1976 Annual Housing Survey (AHS) reveals that responses vary systematically by neighborhoods. Exploiting the clustering in the sample design of the AHS, researchers isolated 'neighborhood effects' by modeling the similarity in responses provided by neighboring respondents. Analytic devices were two regression models with

no controls for neighborhood characteristics and a third model using predictors of socioeconomic variables -- education, income, race, and (where significant) neighbor -- and the neighborhood component N. A fourth analytic device incorporated the three socioeconomic variables, attributes of housing units, rental status, structural problems, and monthly housing costs. A number of conclusions were possible (1) the within - neighborhood variation in the overall neighborhood rating appears random, (2) more than a third of the variation in neighborhood rating is directly attributable to neighborhood differences, and (3) the scale of neighborhood quality is minimally sensitive to neighborhood differences and structural condition of the unit. Overall housing rating varies somewhat among neighborhoods and is modestly sensitive to variation in rental status and structural problems. Study limitations are discussed, mathematical models are presented, and notes and a bibliography are appended.

PB80-173164 MF **A01**
Michigan Univ., Ann Arbor. Inst. for Social Research.
Determinants of Neighborhood Quality: An Analysis of the 1976 Annual Housing Survey,
Robert W. Marans. Mar 79, 40p HUD-0000990, HUD/PDR-474
Contract HUD-H-2257-78
Paper copy available from the Sup. of Docs., Stock number 023-000-00544-1.

Using 1976 Annual Housing Survey data, this paper assesses the contributions to overall neighborhood quality of peoples' evaluations of environmental conditions and public services. The analytic model takes into account (1) the extent to which the presence or absence of conditions influence ratings of neighborhoods, (2) the relative importance of condition and service evaluations in explaining overall neighborhood ratings, and (3) the extent to which the evaluations in households with different background characteristics differ in importance in explaining overall neighborhood ratings. Findings suggest that most Americans are quite content with their neighborhoods; in fact, four in five rated them as either excellent or good. The presence or absence of neighborhood conditions (as measured by respondent's perceptions) account for only one - sixth of all variations in neighborhood quality ratings. People's feelings about conditions around them are more significant to their assessment of neighborhood quality than are perceptions of local government services. Most important among these conditions are neighborhood and housing upkeep, street noise, and crime. Among public services, police protection, public transportation, and health - care facilities are most valued. Population subgroups differed significantly in their ratings of neighborhoods -- poorly educated, young black renters were most likely to give negative overall neighborhood ratings. Ratings by selected attributes did not vary significantly. These findings stimulate several suggestions: (1) future surveys should contain questions covering combined attributes, (2) the use of a different battery of evaluative questions for rural and urban neighborhoods should be considered, and (3) questions on persons' intentions to move from their present residences should be added. Study data and a bibliography are provided. (Author abstract modified).

PB80-173172 PC **A09**/MF **A01**
American Univ., Washington, DC. Center for Urban Public Policy Analysis.
Occasional Papers in Housing and Community Affairs. Volume 4,
Robert Paul Boynton. Jul 79, 191p HUD-0000991, HUD/PDR-497/4

By identifying the characteristics unique to the central city and by analyzing the economic and political issues involved, this volume offers a framework for the development of a rational national policy to meet the urgent needs of the Nation's decaying inner cities. As part of the Office of Policy Development and Research's efforts to provide relevant policy research, these background papers address resource scarcity and the need for conservation and preservation, with particular emphasis on the role of energy in urban development and the impact of rising energy costs. Signs of urban vitality and distress are discussed in light of citizen views on the quality of urban life (satisfaction with public services, the physical and social environment, and the perceived role and capacity of government). Analysis indicates that fundamental shifts in population and in the economic base of the city, as well as relative resource scarcity, have profound impact on the city's inhabitants and a significant long - term effect on how the city is perceived. Other papers examine the factors underlying such troubled aspects of urban life as employment, poverty, income, and population change; the decentralization of urban economies; demographic and economic characteristics of urban households; the physical deterioration in cities; urban fiscal distress; and administrative fragmentation. Finally, an overview of urban issues of the late 1970's encapsulates the problems discussed in previous papers -- the decline in urban economies, the unmet needs of city residents, the incidence of physical deterioration, the persistence of fiscal distress, and the inefficiencies of governments. Federal and State options to improve urban life are also noted. Reference notes and footnotes are provided, with extensive statistical data, charts, and graphs supporting the text.

PB80-173214 MF **A01**
Urban Land Inst., Washington, DC.
Reducing the Development Costs of Housing: Actions for State and Local Governments.
2 Aug 79, 275p HUD-0001050, HUD/PDR-502
Paper copy available from the Sup. of Docs., Stock number 023-000-00555-7.

Over 400 experts and decisionmakers met in early 1979 to discuss high costs of land associated with housing production and to identify steps that State and local governments can take to stabilize or reduce these costs; this report is the product of that conference. It provides background material on land supply and development and, in addition, contains papers, speeches, workshop discussions, and a series of conference recommendations. Much of the conference was focused on five workshops with the following themes: (1) improving development standards in fringe areas, (2) increasing the supply of land inefringe areas, (3) improving the supply of land in fringe areas, (4) improving central city development standards and increasing the supply of land and buildings, (5) allocation of development costs, and (6) improving permit procedures. A research paper was submitted for each of the themes. Speakers and authors of research included HUD Secretary Harris, chairperson of HUD's housing committee, several representatives of local government, a private developer, the director of the Office of Management and Budget, representatives of the Urban Institute and of the American Planning Association, and several university - based experts on urban planning and housing. Conference recommendations, based on proceedings and on a survey of 158 State and local officials and private sector developers who had attended the conference, and citizens, included these suggestions: (1) development costs should be allocated among persons and firms in the community according to the degree by which they would benefit from the service or facility, (2) permit procedures should be simplified and accelerated through standardization, and (3) land use plans and public improvement programs should reflect consideration of the impact of development constraints on land supply and housing costs. Tables and photographs are included, with survey data and a list of conference attendees appended.

PB80-173222 PC **A05**/MF **A01**
RAND Corp., Santa Monica, CA.
Residential Mobility of Housing Allowance Recipients. Housing Assistance Supply Experiment,
Mark David Menchik. Oct 79, 85p HUD-0001051
Contract HUD-H-1789

Unlike most other housing subsidies, housing allowances are portable; this component of the Housing Assistance Supply Experiment describes the influence of 'portability' on the residential mobility of allowance recipients during the experiment's first 2 years. It develops a new statistical procedure that analyzes 'censored' residential histories and applies the procedure to early mobility data. In the 2 experimental sites (Brown County, Wis., and St. Joseph County, Ind.), 9,100 households received housing allowances during the first 2 years. Only 1,900 of these recipients (20 percent) moved while enrolled in the program. Statistically transforming the data into annual probabilities of moving vary sharply with household characteristics and with the way the program's housing requirements were met. For about half the enrollees, the dwellings occupied at the time of enrollment met the program's standards; others were repaired after enrollment. Among eventual recipients, 14 percent qualified for payments by moving to an acceptable dwelling. That group, fully two - thirds of all mobile recipients, is therefore dominated by those whose previous dwelling did not meet program standards. Influences on mobility include certification of enrollment dwellings, renting rather than owning, the household's stage in the family life cycle, and tenure. Study data and equations are presented. (Author abstract modified).

PB80-173230 PC **A06**/MF **A01**
RAND Corp., Santa Monica, CA.
Codebook for the Housing Allowance Office (HAO) Recertification Characteristics File: Site II, Year 3. Housing Assistance Supply Experiment,
Ann W. Wang, and Leslie Geller. Oct 79, 121p HUD-0001052
Contract HUD-H-1789

The data to be found in the recertification characteristics file covering the first 3 years of HUD's Housing Assistance Supply Experiment operating in Site II, St. Joseph County, Ind., are presented. They pertain to the 10,847 households that enrolled from December 1974 through December 1977. For each variable in the file, the codebook identifies the corresponding question on the administrative form, specifies all permissible responses, and presents tabulations of response frequencies (marginals). Once enrolled in the allowance program, a household may remain enrolled as long as it continues to meet program eligibility requirements. Periodic recertification -- semiannual, annual, special, and reinstatement -- is required to verify continued eligibility. The file necessary to this recertification process is arranged by client identification number and contains a summary of the client's characteristics file data, followed by summaries of all recertification transactions, up to a total of 35. The segments within a client record are arranged by transaction date. Besides the four types of recertification, the file segments include updates, error corrections, verification corrections, and revisions of program standards. Codes are explained in the text. Recertification and housing unit certification forms, tables of standard housing expenses (1975 to 1977), and neighborhood tract census maps are appended.

PB80-173248 PC **A07**/MF **A01**
RAND Corp., Santa Monica, CA.
Codebook for the Housing Allowance Office (HAO) Housing Characteristics File: Site II, Year 3. Housing Assistance Supply Experiment,
Ann W. Wang, and Leslie Geller. Oct 79, 127p HUD-0001053
Contract HUD-H-1789

This codebook documents one of the research files compiled from administrative records of a Housing Allowance Office (HAO) as part of the large - scale Experimental Housing Allowance Program. The Housing Assistance Supply Experiment (HASE) operates identical programs in Brown County, Wis., and St. Joseph County, Ind. The HAO established at each of these sites enrolls eligible applicants, evaluates their current or prospective housing, and disburses program payments. This codebook describes each variable in the HAO housing characteristics file from the program's first 3 years in Site II, St. Joseph County, Ind. It also identifies the administrative record from which the variable was taken, reproduces the relevant portion of the administrative forms, specifies all permissible entries, and annotates each element with a complete definition. The codebook also contains marginals for each data element -- a tabulation of all responses in the housing characteristics file. Four appendices include the Housing Unit Evaluation and Certification Forms, a glossary, maps of Site II neighborhoods and census tracts, and tables of standard housing expenses. An index of variables is attached. (Author abstract modified).

PB80-173255 PC **A12**/MF **A01**
RAND Corp., Santa Monica, CA.

Codebook for the Housing Allowance Office (HAO) Client Characteristics File: Site II, Year 3. Housing Assistance Supply Experiment,
Ann W. Wang, and Leslie Geller. Oct 79, 264p HUD-0001054
Contract HUD-H-1789

In monitoring the effects of a large - scale Experimental Housing Allowance Program, HUD's Housing Assistance Supply Experiment (HASE) relies for program information on the Housing Allowance Office (HAO), a nonprofit corporation that administers the program in two experimental sites. The HAO's administrative records, periodically compiled into three cumulative research files, provide information about the characteristics of clients, the activities involved in the recertification of their eligibility, and the attributes of their housing. This codebook describes the data in the client characteristics file for the program's first three years of operation in St. Joseph County, Ind., Site II. Although the data covered all 23,238 households that applied for assistance from December 1974 through December 1977, it applies mainly to the 10,847 households that actually enrolled in the program during that period. For each variable in the file (e.g., household size, tenure, year of enrollment, etc.), the codebook identifies the corresponding question on the administrative form, specifies all permissible responses, and presents tabulations of response frequencies (marginals). Appendix A reproduces the administrative forms on which the HAO files are based; Appendix B shows tables of standard housing expenses developed by HASE; Appendix C contains maps of St. Joseph County neighborhoods and census tracts. (Author abstract modified).

PB80-173263 PC **A04**/MF **A01**
RAND Corp., Santa Monica, CA.
Neighborhoods in St. Joseph County, Indiana. Housing Assistance Supply Experiment,
John E. Bala. Sep 79, 56p HUD-0001055
Contract HUD-H-1789

To facilitate analysis of the effects of an Experimental Housing Allowance Program, the Housing Assistance Supply Experiment (HASE) divided Site II, St. Joseph County, Ind., into 86 neighborhoods and 8 general purpose analytic districts. This report describes the neighborhoods and districts and assesses the appropriateness of the district boundaries. Neighborhoods are residentially homogeneous areas that vary in population from 2,000 to 4,000 residents and in size from 200 to 33,000 acres. Analytic districts are formed by aggregating neighborhoods into larger geographic units. Using an analysis of variance model on 5 demographic and 12 housing characteristic variables, researchers found that the St. Joseph districts explain a small but statistically significant amount of variation in each of the demographic variables (total household income, age of household head, gross rent, race, tenure) and a larger amount of variation in the housing characteristic variables (property value per unit, land price, lot size, improvements value per square foot, interior floor area per unit, construction year, neighborhood quality). Further, the districts appear about equally homogeneous, with South Bend, an area with a more varied ethnic population and household tenure, being the exception. Analytic districts, therefore, are useful for organizing HASE analyses of spatially distributed phenomena. Tables and an appendix are included. (Author abstract modified).

PB80-173271 PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
Audit of the Housing Allowance Office (HAO) Analysis Files, Site II, Year 3. Housing Assistance Supply Experiment,
Ann W. Wang. Oct 79, 37p HUD-0001078
Contract HUD-H-1789

This report presents the findings of an audit of administrative data collected by the Housing Allowance Office (HAO) in St. Joseph County, Ind., during the first 3 years of the Housing Assistance Supply Experiment -- December 1974 through December 1977. This audit report assesses the quality and accuracy of the data to benefit future users and improve administrative and data preparation procedures at the HAO. Administrative data were collected on various forms for preliminary and enrollment application, dwelling evaluation, payments eligibility certification, authorization and adjustment of payments, and program termination. Preliminary data cleaning, analysis file checks, and review of marginals (response frequencies) of each variable confirmed the thoroughness of the audit and the effectiveness of the preliminary checks in detecting nearly all errors. Future strategies will include checks on chronological inconsistencies in client histories. An appendix and supplementary tables are included. (Author abstract modified).

PB80-173289 PC **A04**/MF **A01**
RAND Corp., Santa Monica, CA.
Audit of the Neighborhood Survey, Site I, Wave 4. Housing Assistance Supply Experiment,
Carol E. Hillestad. Nov 79, 64p HUD-0001079
Contract HUD-H-1789

This report presents the findings of an audit of data collected in the Wave 4 survey of neighborhoods in Brown County, Wis., from November 1976 to October 1977. The neighborhood survey is one of several conducted in the county as part of the Housing Assistance Supply Experiment (HASE). The survey was based on secondary research and direct observation, was addressed to the entire county rather than to a stratified probability sample of residences, and used neighborhood and street segments as observation units. This audit report was designed to account for each element scheduled for survey at the beginning of the fieldwork, assess the amount and significance of missing data, estimate the frequency and significance of response errors, and document changes in the survey instrument or methods of preparation and judge their effects on data. Neighborhood local sources (NLS) collected information about the 108 HASE - designated neighborhoods in the county, and other field workers collected information on 99.4 percent of the county's neighborhood street segments (NSOB). Both NLS and NSOB data were judged to be of good quality, so averaging quality ratings for neighborhood segments served as useful analytical indices. Footnotes, tables, a glossary, and neighborhood maps are included. Appendices contain supplementary tables and data. (Author abstract modified).

PB80-173313 MF **A01**
National Committee Against Discrimination in Housing, Inc., Washington, DC.
Guide to Fair Housing Law Enforcement,
George Schermer. Jul 79, 72p HUD-0001084, HUD/PDR-491
Paper copy available from the Sup. of Docs., Stock number 023-000-00556-5.

Assuming a wide range of knowledge, experience, and sophistication among its readers, this guide stresses fair housing practices and enforcement as well as equal opportunity in housing. One major objective is to substantially broaden the base of active support for fair housing among those who are concerned but have not yet benefited from established - local - group experiences. It begins with discussion of fair housing law, Federal and State policy, and Federal enforcement history. Overall, the enforcement record, though having notable achievements, is quantitatively poor. Reasons include the weakness of Title VIII as an enforcement instrument, diffuse enforcement responsibility, inadequate resources and staff, remoteness of retail marketing of housing (done almost entirely by small, local business persons or private owners) from Federal agencies, and the absence of a significant volume of cases containing good evidence. To counteract these deficiencies, the guide offers a comprehensive local strategy and an action program; it also provides a detailed testing method for ascertaining fairness of housing practices. Fair housing organizations should direct efforts at eliminating all kinds of discrimination -- racial, sexual, national, etc., -- along with practices such as racial steering. They should provide wronged persons with assistance necessary to combat unfair practices and obtain remedies. The guide assists these organizations by explaining how to build a constituency, marshal necessary resources, and formulate an action strategy to thoroughly inform the public, encourage minority homeseekers in pursuing housing alternatives, collect valid evidence of unlawful practices, and take legal or administrative action where necessary. The complaint process is outlined from preparing complaint forms to investigation, approaching the respondent and class action filings, and finally to monitoring agreements and affirmative marketing plans. Appendices provide the HUD housing market practices survey (1976), references, lists of States with fair housing laws, and summaries of private litigation.

PB80-173321 PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
Estimated Effects of Increased Income on Homeowner Repair Expenditures. Housing Assistance Supply Experiment,
Lawrence Helbers. Nov 79, 39p HUD-0001085
Contract HUD-H-1789

This report used a predictive model of homeowner repair expenditures to estimate how much more elderly households would spend on home repairs if they received reverse annuity mortgage (RAM) payments of $600, $1,200, or $2,400 annually. The model is calibrated using data from the baseline survey of homeowners in Brown County, Wis., (1974) and St. Joseph County, Ind., (1975) - - the two sites of the Housing Assistance Supply Experiment (HASE). Repair expenditures are predicted as a function of household income, household structure, age of household head, education of household head, length of occupancy, property value, number of rooms, and age of structure. RAM payments are treated as additional income. Predictions are given for 15 categories of elderly households using coefficients estimated from HASE baseline survey data, as well as elderly household descriptors from U.S. annual housing survey data. There is a prediction for each household type given its original income and the augmented incomes under the hypothetical RAM programs. The estimated income elasticity of demand for repair and improvement expenditures falls between 0.83 and 1.16 for elderly homeowners. A 1 - percent increase in their income would therefore imply a 0.83 to 1.16 - percent increase in repair and improvement expenditures. Average repair expenditures would typically increase by less than 10 percent of the annual RAM payment. Footnotes and extensive tabular data are included. The appendix derives formulas for the income elasticities of demand and provides supplementary technical tables.

PB80-173362 PC **A04**/MF **A01**
RAND Corp., Santa Monica, CA.
Using Hedonic Indexes to Measure Housing Quantity. Housing Assistance Supply Experiment,
C. Lance Barnett. Oct 79, 60p HUD-0001099
Contract HUD-H-1789

This report presents and appraises the usefulness of a hedonic index for measuring services of rental dwellings in Brown County, Wis. A hedonic index for housing is a regression equation that relates the attributes of dwellings (e.g., number of rooms, type of heating system, quality of the neighborhood) to the gross rent (rent plus payments for utilities). It is used by researchers to measure services supplied by dwellings that are comparable across dwellings and over time. Using 1974 survey data collected as part of HUD's Housing Assistance Supply Experiment (HASE), the index consists of 17 attributes that describe the interiors and exteriors of dwellings and 6 that describe the location of the dwellings. The regression was found to fit the data well. It predicted the gross rent of individual dwellings with a standard error of $20 or 15 percent of average monthly gross rent ($137). The report confirms that the estimated prices satisfy the conditions necessary for dwellings to be treated as if they provide homogeneous and comparable flows of services (i.e., that the attributes of dwellings are a composite commodity). It then presents two ways the index can be used to study households' housing choices. The first is to determine how to find bargains (the most effective way is through tips from friends); the second is to show the effects of renters' income on their consumption of four summary attributes -- space, interior quality, exterior quality, and location. Findings indicate that higher income renters tend to buy 'better' rather than 'more' housing. They also live farther from the center of towns, preferring better neighborhoods to access. It is anticipated that the index will provide HASE with a useful analytic tool to study housing markets, household choices, and

landlord behavior. Footnotes, tabular data, a graph, and references are included. (Author abstract modified).

PB80-176845 PC **E02**/MF **E02**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
On 1012: A Check on Earth Carrying Capacity for Man.
Final rept.,
C. Marchetti. c1978, 21p RR-78-7

The report examines the issue of how much human population the earth can tolerate. The result of this analysis is that from a technological point of view a trillion people can live beautifully on the Earth, for an unlimited time, without exhausting any primary resource and without overloading the environment. The global view of the problems and of their solutions makes the difference, and shows that most of the physical limits to growth stem from an inappropriate frame of reference.

PB80-177157 PC **A07**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
Evaluation of CSA Emergency Energy Conservation Services Program; Research Design: Sampling, Data Collection, Data Management, Data Analysis.
7 Jun 78, 127p CSA-LN-2405
Contract CSA-B7B-5547
See also PB80-121197.

This report details the research design and methodology for an evaluation of CSA's Emergency Energy Conservation Program.

PB80-177298 PC **A02**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Promotion of Cargo Security Receives Limited Support.
31 Mar 80, 25p CED-80-81

The Department of Transportation's Office of Transportation Security, working through a voluntary program, coordinates and promotes cargo security activities in 15 metropolitan area 'city campaigns' and encourages industry to use various cargo security measures. The Office also provides data on the extent of the cargo theft problem. The effectiveness of the Office's program is hindered by its limited budget, inadequate staff resources committed to the city campaigns, and industry's minimal interest. The Office's data has understated the extent of the problem and may not be reliable and useful in the future. The Department is evaluating the future of the cargo security program and the Office's collecting, processing, and publishing of cargo theft data.

PB80-177629 PC **A16**/MF **A01**
Columbia Univ., New York. Center for the Social Sciences.
The Impact of Family Background, Educational Credentials, And Academic Ability on Attaining High Income: An Analysis of Three Post-War Cohorts,
Paul William Kingston. Apr 80, 358p DLETA-91-36-77-50-1
Grant DL-91-36-77-50

To a considerable extent, the subject matter of this research--the rich--almost inherently seems to mute the policy relevance of the findings. Yet, patterns of access to the top slots are symbolically critical, and general societal issues related to how occupational positions should be distributed are being most pointedly contested at the elite level. In this context, then, the finding that where one goes to school does count, as well as the widespread belief in this fact, means that policy makers should give particular attention to patterns of access to the elite colleges and professional schools. Many have already found that a college degree does not create good life chances; it has become the necessary entry ticket to jobs with quite modest career prospects. In assessing educational equity, therefore, all colleges--and for that matter, business and law schools--should not be considered alike. By not distinguishing among prestige levels of schools, many commentators have overstated the egalitarian character of American higher education. Only in recent years, as the educationally privileged remain largely economically privileged, have these admissions criteria been fundamentally challenged. Minority groups have been at the forefront of this challenge with their demands for affirmative action. For the immediate future, proponents of 'affirmative action' for minorities seem quite right in contending that conventional meritocratic principles work to hold them back from elite schools and, concomitantly, elite occupational positions. What remains largely submerged in the public debate, however, is that these same considerations work to hinder the mobility of economically unfavored whites as well.

PB80-179104 PC **A04**/MF **A01**
Berkeley Planning Associates, CA.
The Client Perspective on Performance in the Special SSDI and SSI Vocational Rehabilitation Programs.
Final rept.,
Susan Shea, J. Mark Rogers, Shirley Langlois, and Joe Mancini. Feb 80, 59p ASPE/SSHD-78-13
Contract DHEW-100-78-0066

The Report summarizes the findings of a survey of 321 DI/SSI recipients who were clients of a state vocational rehabilitation agency. The objective of this survey was to begin to identify factors which enhance the probability of two events: (1) attainment by special program clients of earnings at least equal to the substantial gainful activity level; and, (2) termination of special program from the SSI and/or SSDI rolls. The report presents a descriptive analysis of the judgmental sample relative to client traits, disincentives, VR experience, and outcomes. An explanatory analysis probes the relationships between outcomes and (1) client traits; disincentives; and, (3) VR service experience.

PB80-179823 PC **A04**/MF **A01**
Michigan Univ., Ann Arbor. Highway Safety Research Inst.
Estimation of the Coverage of New Programs Based on Driver Incident Data.
Final rept. Jun 78-Dec 79,
John A. Green, Paul E. Lehner, and Christopher R. Ford. Jan 80, 54p UM-HSRI-80-7
Sponsored in part by Michigan Office of Highway Safety Planning, Lansing.

The purpose of the program was to develop a computerized system for determining the number of registered drivers in the State of Michigan that might be affected each year by all major proposals that are concerned with the assignment of drivers to post-licensing control activities. Two tasks were completed: First, a data structure was designed to generate information necessary for system operation from the State's Master Driver Record file. Second, a frequency analysis program was written to count occurrences in this data structure for situations of interest. Pilot tests of the system have indicated that it can be a valuable, time-saving tool in program evaluation.

PB80-180565 PC **A03**/MF **A01**
Berkeley Planning Associates, CA.
Establishing Policy in the Special SSDI and SSI Vocational Rehabilitation Programs.
Final rept.,
Susan Shea, and Richard Dodson. Feb 80, 50p ASPE-SSHD-78-12
Contract DHEW-100-78-0066
See also PB80-182553.

The Report summarizes the state of knowledge regarding the SSI/DI rehabilitation programs, factors which affect the probability that rehabilitation services will return a disabled DI or SSI recipient to the labor force, and options for increasing the prospects for success.

PB80-180854 PC **A06**/MF **A01**
California State Dept. of Motor Vehicles, Sacramento.
Development of a Provisional Licensing Program for New California Drivers,
Elmer Brown, David W. Carpenter, Bart F. Furtado, Keith H. Lindholm, and Lowell Gates. Feb 80, 112p CAL-DMV-RSS-79-73

This report documents the development of a provisional licensing program for original California driver's license applicants. The impetus for considering alternative licensing procedures was the high accident and traffic-conviction rates characteristic of new drivers. An initial provisional licensing model was developed, following consideration of traffic safety literature on new drivers and a review of provisional licensing programs implemented or piloted in other states and countries. Further refinements were made following an analysis of comments solicited from a number of individuals in various traffic-safety disciplines, and following an independent survey of California public opinion. It was recommended that a limited pilot be conducted with original 'minor' applicants to determine the traffic-safety effectiveness of the final program model. The primary model includes a one-year distinctive provisional license, a youth-oriented driver improvement program, various restrictions for young problem drivers, the encouragement of parental participation in training new young drivers, driver's manuals for new drivers, and a variety of operational changes, including a mandatory instruction permit.

PB80-181092 PC **A05**/MF **A01**
Connecticut Univ., Storrs. School of Home Economics.
Investigation of Feasibility and Need Factors Involved in Establishment of Special WIN Unit for Women Losing AFDC Eligibility.
Final rept.,
Jane Berry, and Esther McCabe. 29 Sep 79, 96p DLMA-51-09-79-01-1
Grant DL-51-09-79-01

Project aims were (1) to investigate the attitudes and perspectives of women approaching loss of AFDC eligibility (2) to determine what special services would be of assistance in transition from full-time homemaker to labor market participant. Interviews were conducted with clients within one or two years of eligibility loss and with WIN staff at three geographical sites.

PB80-189863 PC **A13**/MF **A01**
Bureau of the Census, Washington, DC.
Annual Housing Survey: 1977. Part A. General Housing Characteristics for the United States and Regions: 1977.
Current housing rept. (Annual).
Sep 79, 285p H-150-77A, HUD-0001420
See also report dated Feb 78, PB-288 736, and PB80-189871.

This volume is the first of a six-part series reporting statistics from the 1977 Annual Housing Survey for the U.S. by inside and outside standard metropolitan statistical areas and each of the four geographic regions. The statistics provide data on general housing characteristics, obtained by personal interview from a sample of 77,000 housing units located throughout the country. The sample was selected from units enumerated in the 1970 census and updated to include units constructed since. Tables devoted to specific topics include housing characteristics for 1977 and 1970, characteristics of mobile homes and trailers, characteristics of new construction units, and characteristics of units removed from inventory.

PB80-189871 PC **A13**/MF **A01**
Bureau of the Census, Washington, DC.
Annual Housing Survey: 1977. Part C. Financial Characteristics of the Housing Inventory for the United States and Regions: 1977.
Current housing rept. (Annual).
Jun 79, 281p H-150-77C, HUD-0001422
See also PB80-171978, and PB80-189863.

This volume is the third of a six-part series reporting statistics from the 1977 Annual Housing Survey for the U.S. by inside and outside standard metropolitan statistical areas and each of the four geographic regions. The statistics provide data on financial characteristics of the housing inventory, obtained by personal interview from a sample of 77,000 housing units located throughout the country. The sample was selected from units enumerated in the 1970 census and updated to include units constructed since. Tables contain characteristics for owner-occupied and renter-occupied housing units by income of the family or primary individual, characteristics for owner-occupied one-family homes by value of property, and characteristics for renter-occupied housing units by gross rent.

PB80-810815 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Probation and Parole. 1964-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-May 80,
Mary E. Young. Jun 80, 142p
Supersedes NTIS/PS-79/0576 and NTIS/PS-78/0530.

The research concentrates on parole and probation systems for both young offenders and adult prisoners. Reports directed toward probation or parole work, as a career or volunteer project, and automation of decision making for parole are included. (This updated bibliography contains 135 abstracts, 16 of which are new entries to the previous edition.)

PB80-810997 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Police. Operations, Management, Training, Behavior, Equipment. 1978-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1978-May 80,
Mary E. Young. Jun 80, 128p
Supersedes NTIS/PS-79/0613 and NTIS/PS-78/0543. See also 1964-1974, NTIS/PS-76/0453, and 1975-1977, NTIS/PS-79/0612.

Aspects of police use in law enforcement are included in the reports cited. Topics included are new types of equipment, studies on patrol cars, and computer models of patrol allocations. The studies will be of interest to police departments, urban planners, and others interested in the police function. (This updated bibliography contains 121 abstracts, 51 of which are new entries to the previous edition.)

PB80-811169 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Day Care Centers: Children and Youth. 1964-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-May 80,
Mary E. Young. Jun 80, 121p
Supersedes NTIS/PS-79/0569 and NTIS/PS-78/0520.

Centers which have programs for daily care of children and young people are described in the reports cited. Included are centers for the care of infants and children of working mothers, counseling services for delinquent or disturbed youth, and day care for handicapped children not requiring institutionalization. (This updated bibliography contains 114 abstsracts, 12 of which are new entries to the previous edition.)

PB80-811177 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Day Care Centers: Adults. 1964-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-May 80,
Mary E. Young. Jun 80, 75p
Supersedes NTIS/PS-79/0570 and NTIS/PS-78/0521.

Programs for the daily care of adults and the centers sponsoring the programs are described in the reports cited. Although primarily concerned with care of the elderly, programs for the retarded and handicapped are also included. Recreational, educational, and health programs are described. (This updated bibliography contains 68 abstracts, 11 of which are new entries to the previous edition.)

PB80-811185 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Crimes and Crime Prevention. 1977-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1977-May 80,
Mary E. Young. Jun 80, 201p
Supersedes NTIS/PS-79/0614 and NTIS/PS-78/0545. See also 1964-1976, NTIS/PS-78/0544.

Reports are cited on vandalism, shoplifting, nuclear materials theft, pilferage, assault, rape, murder, stolen goods fencing, book theft, and larceny. Crime prevention systems for homes, businesses, and vehicles are described. Law enforcement studies not concerned directly with crime prevention are excluded. Some of the investigations deal with statistics and prevention of crime through social services. Police planning and training to reduce crime are referred to, but police operations in general are documented in a separate bibliography. Other separate Published Searches are available that cite materials on offender rehabilitation, crime prevention through community action, crime and law enforcement in transportation, behavior and psychology related to criminology, prevention through weapon and intrusion detection, computer security and privacy, and juvenile delinquency. (This updated bibliography contains 194 abstracts, 60 of which are new entries to the previous edition.)

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

IAEA-R-1668-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Studies on the Radiation Chemistry of Biomolecules in Aqueous Solution with Specific Objective of Minimizing Their Radiolytic Degradation. Coordinated Programme for Asia and the Pacific Region on Radiation Sterilization Practices Significant to Local Medical Supplies and Conditions. Final Report for the Period 1 November 1975 - 31 October 1978.
K. Narayana Rao. Jan 79, 15p
U.S. Sales Only.

As part of a study of radiolytic degradation of pharmaceuticals during radiosterilization, the basic radiation chemistry of the B-group vitamins, nicotinamide, pyridoxin, riboflavin and thiamine, and the reaction of hydrogen peroxide with these same materials has been investigated. The various aspects studied were - radiolysis under controlled conditions, effects of phase, temperature, pH and nature and concentration of additives. Some of the conclusions are: 1) with oxygen saturated aqueous solutions containing glucose, the radiolytic degradation of the vitamins is reduced: 2) results a similar for N sub 2 O saturated aqueous solutions; 3) in glucose-containing solutions, the protective effect is considerably modified at higher temperatures; and 4) irradiation of air-saturated aqueous solutions in the frozen state leads to reduced decomposition. It is concluded that in the presence of oxygen, in frozen matrices at low temperature, it appears possible to reduce the radiolytic breakdown of vitamins to low levels. (Atomindex citation 10:481731)

INIS-mf-4329 PC **A04**/MF **A01**
Kiel Univ. (Germany, F.R.). Fachbereich Medizin.
Time-Dependent Labelling Course of Human Eosinophilic Granulocytes after exp 3 H Thymidine Application.
Diss. (M.D.),
A. J. Walle. 2 Dec 75, 53p
In German.
U.S. Sales Only.

After intravenous injection of 0.1 mu Ci/g body weight exp 3 H-Thymidine and taking of blood samples in intervals of 6-12 hrs. on three test persons with healthy blood, the labelling course of the eosinophilic granulocytes was studied. The cells were classified in four groups, according to the relative frequency of the different degrees of labelling. The time-dependent labelling index curves showed a nawe-sheped course. Elimination of the eosinophilics from the blood is carried out according to the 'At-random'-principle. 12 hrs. p.i. already 10% of the eosinophilics in the blood were labelled with maximally 5 grains. The cell flow-in phase of 13 hrs. was succeeded by a flow-out phase of nearly the same duration, afthr the first labelling maximum of 17%. 80 hrs. p.i. the first massive inflow of high-labelled cells containing more than 30 grains. After reaching the labelling maximum of 58%, the labelling index values decreased continuously. Until the 11th day p.i., appr. 50% of the eosinophilics were still labelled, after 17 days appr. 25%, more than 65% of which consisted of cells with only 2-4 grains. Comparison of the labelling index curves of the grain groups with each other shows at first a synchronous, then an increasingly asynchronous course, according to the desynchronization of the several eosinophilic generation cycles in the bone marrow which gets more significant in the course of time. (Atomindex citation 09:391788)

INIS-mf-4349 PC **A08**/MF **A01**
Freie Univ. Berlin (Germany, F.R.). Fachbereich Pharmazie.
Effects of D sub 2 O on Biochemical Parameters of Normal Cells and Tumour Cells.
Diss,
G. Biesewig. 15 Apr 75, 171p
In German.
U.S. Sales Only.

The influence of high temperatures (Hyperthermia) on normal tissue and Ehrlich-Ascites tumor cells ('ATZ') was examined under several conditions with regard to the application of deuterium oxide as a stabilizing factor. It was proven that the DNA synthesis of normal tissue (liver, mouse) is not sensitive to temperature. This effect of hyperthermia only occurs when the tissue is damaged, e.g. by trypsinizing. The influence of hyperthermia on several biochemical parameters and on morphological changes of the Ascites cells was examined. The findings show that deuterium oxide (D sub 2 O) is able to reduce both the thermal and the ureal denaturation of enzymes. Thus tests were carried out to find out if D sub 2 O also reduces toxic influences in complicated biological systems. The assumption that high D sub 2 O concentrations prevent several reactions was confirmed. When Ascites tumor cells in H sub 2 O-buffer were exposed to hyperthermia, a high degree of damage was seen with decreasing DNA synthesis, reduced aerobic glucose capacity, a drop in the ATP values, and breakdown of the permeability of the membrane. Deuterium oxide was able under high temperature (from appr. 44 exp 0 C on) to reduce the degree of damage to DNA synthesis, while autoeffects (inhibition of synthesis) of D sub 2 O predominate in the lower region. Aerobic glycolysis was damaged in both cases to the same degree, however. In D sub 2 O after hyperthermia, the ATP-level dropped faster than in H sub 2 O. D sub 2 O not only reduces the thermal denaturation of the Ascites tumor cells, but it also eliminates the toxic influence of the cytostatic drug TRENIMONsup(R) (under 38 exp 0 or 46 exp 0 C incubation). (Atomindex citation 09:395154)

PB80-178932 PC **A04**/MF **A01**
Weizmann Inst. of Science, Rehovot (Israel).
Interaction of Natural and Modified Biopolymers with Platelets.
Final rept. 1 Aug 78-30 Sep 79,
F. A. Meyer, I. R. Miller, J. Lahav, A. Silberberg, and Z. Weisman. Oct 79, 59p NIH-N01-HV-5-2907-05
Contract N01-HV-5-2907
See also report dated 1 Aug 78, PB-293 644.

The biocompatibility of materials depends largely upon how platelets react with them. Since in hemostasis platelets are activated on collagen fiber surfaces this interaction is useful in characterizing the surface feature being recognized. Using collagen surfaces of gradated surface curvature it was shown that the rate of adhesion of platelets increases as fiber diameter decreases and that aggregation occurs on fibers of diameter less than that of the platelet. Aggregation was not the result of surface-induced platelet spreading. A similar effect on the rate of adhesion was seen on albumin, denatured collagen and glass surfaces but activation did not occur. Therefore, a combination of a favorable substrate chemistry and morphology is involved. It could be shown that the major platelet membrane glycoproteins GP1, 2a/b and 3 do not mediate platelet adhesion to collagen. However, using a collagen fiber affinity column a platelet membrane component of high affinity to collagen could be isolated. Platelets adherent on the column were lysed with Triton. Subsequent elution with sodium dodecyl sulphate left a single membrane component of 80,000 molecular weight still attached to collagen.

PB80-929901 PC**$6.50**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.

Selected Aspects of Cancer-Related Nucleic Acid Biochemistry.
Special listing.
14 May 80, 104p NCI/ICRDB/SL-342
Supersedes NTISUB/E/299-004.

The Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. Approximately 50 different cancer research areas are covered by a separate Special Listing. The research areas include: Cancer-related DNA biochemistry; Control of gene expression and DNA transcription; Cancer-related RnA biochemistry; Cancer-related purine and pyrimidine metabolism; Cyclic nucleotides in normal and neoplastic cells.

UCID-18288 PC **A06**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Biogeochemical Studies of Wintering Waterfowl in the Imperial and Sacramento Valleys.
J. J. Koranda, M. Stuart, S. Thompson, and C. Conrado. Oct 79, 120p
Contract W-7405-ENG-48

Trace and major elemental composition were determined in the organs of wintering waterfowl in the Imperial and Sacramento Valleys of California, and in soils, sediments, and agricultural fertilizer that constitute the various sources of elements in the waterfowl. These data provide a biogeochemical baseline for waterfowl populations wintering in an area being developed for geothermal power. This baseline in the Imperial Valley is affected by soil and sediment composition, agricultural effluents in irrigation and stream water, and spent shot deposited by hunters in waterfowl habitats. The waterfowl acquire a set of trace elements from these sources and concentrations increase in their organs over the wintering period. Nickel, arsenic, selenium, bromine, and lead are the primary elements acquired from soil sources, agricultural effluents, and spent shot in the Imperial Valley. The assessment of effects from geothermal effluents on waterfowl populations in complex because there are large influxes of materials into the Imperial Valley ecosystem that contain trace elements, i.e., irrigation water, phosphatic fertilizers, pesticides, and lead shot. Multiple sources exist for many elements prominent in the expected geothermal effluents. The relationships between the two California valleys, the Imperial and Sacramento, are apparent in the trace element concentrations in the organs of waterfowl obtained in those two valleys. Arsenic is absent in the waterfowl organs obtained in the Sacramento Valley and relatively common in the Imperial Valley waterfowl. The effect of any release of geothermal effluent in the Imperial Valley waterfowl habitats will be difficult to describe because of the complexity of the biogeochemical baseline and the multiple sources of trace and major elements in the ecosystem. (ERA citation 05:018084)

6C. Biology

AD-A083 676/7 PC **A02**/MF **A01**
Boston Univ MA School of Medicine
Temperature Effects on Shape and Function of Human Granulocytes,
F. J. Lionetti, P. S. Lin, R. J. Mattaliano, S. M. Hunt, and C. R. Valeri. 26 Feb 79, 14p
Contracts N00014-79-C-0168, N00014-73-C-0100
Pub. in Experimental Hematology, v8 n3 p304-317 Mar 80.

No abstract available.

AD-A083 985/2 PC **A03**/MF **A01**
Kentucky Univ Lexington Dept of Pathology
Isolation and Characterization of a Hibernation Inducing 'Trigger(s)' from the Plasma of Hibernating Ground Squirrels (Citellus tridecemlinsatus) and Woodchucks (Marmota monax).
Progress rept. 1 Mar-1 Jul 79,
Peter R. Oeltgen, and Jean K. Oeltgen. 1 Jul 79, 50p
Contract N00014-76-C-0485

A hibernation induction trigger (HIT) is present in the plasma of hibernating woodchucks and ground squirrels which can induce hibernation when injected in summer-active ground squirrels. Recent biochemical characterization of this HIT molecule in our laboratory utilizing three distinct resolving techniques, isoelectric focusing, a preparative isotachophoresis, and affinity chromatography clearly indicates that this molecule is bound to or closely associated with albumin in the plasma of hibernating animals. Moreover, our recent efforts to develop an assay for HIT activity of resolved plasma fractions utilizing primates as test animals has given the first indication that this molecule may initiate transient yet profound physiological alterations in these animals. When small amounts of the HIT-active plasma fractions are infused into the brain ventricle fluid of monkeys we have noted some truly remarkable physiological responses such as depressed metabolism, hypothermia, decreased heart rate and the appearance in some animals of an anesthetized state. Our goals are two-fold, we intend to isolate a completely homogeneous HIT molecule which is dissociated from albumin utilizing the techniques of preparative gel electrophoresis and column chromatography.

DOE/TIC-10285 MF **A01**
Tennessee Univ., Knoxville.
Nucleosome Structure and Conformational States.
P. N. Bryan. Aug 79, 152p
Contract EY-76-C-05-0033
Thesis.
Microfiche copies only.

The study of chromatin and nucleosomes by biochemical and biophysical methods is described. The techniques used include circular dichroism, thermal denaturation, analytical ultracentrifugation, nuclease digestion pattern, and electron microscopy. The effect of urea on the structure of nucleosomes and chromatin was studied. It was found that there are two domains in the nucleosome which respond differently to urea. The observation that different domains of the nucleosome exhibited different responses to urea offers a basis for viewing the altered conformation of transcriptionally active chromatin. Modulations of the DNA-rich shell by nonhistone proteins or histone modifications might occur with only minor alterations in the conformation of the protein-rich core, permitting rapid renaturation to the transcriptionally inactive chromatin configuration. In order to study the effect of DNA sequence and base composition on nucleosomal strcture, histone-DNA complexes containing histones (H2A, H2B, H3, H4) and a variety of DNAs, including synthetics, were reconstructed. The properties of the reconstructed complexes were similar to those of H1- and H5-depleted chromatin. Monomer nucleosomes were homogeneous with respect to DNA length and exhibited clear nucleosomal structure. It was possible to obtain good reconstruction between chicken erythrocyte inner histones and DNA of a wide variety of G + C%.Nucleosomes containing poly(dA-dT) gave detailed information about the internal structure of nucleosomes. The nucleosome appeared to have two domains of DNA differing in secondary structure. Nucleosomes containing poly(dA-dT) were also sensitive indicators of conformation changes in structure due to temperature and ionic strength. (ERA citation 05:018042)

KFKI-1978-36 PC **A03**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Complex Method for the Neutron Activation Analysis of Biological Materials.
M. Ordogh. May 78, 28p
U.S. Sales Only.

The destructive and nondestructive approach of neutron activation analysis used by the author is reviewed to determine some trace elements in biological materials: Ca, Cl, Co, Cu, Fe, K, Mg, Mn, Na, Rb, Sb, Sc, V and Zn. Bowen's kale was used to determine the accuracy and reliability. The parameters obtained were confirmed by participating in round robins organized by the IAEA: in which potato powder and animal bone have been analyzed for Zn, Co, Fe, Cr, Mn, Rb, Na, K and Cu. Tabulated results are given and compared with recommended values and literature data. Gamma spectra are shown. (Atomindex citation 10:468654)

KFKI-1978-46 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Retention of exp 32 P Activity Interfering with the Neutron Activation Analysis of Trace Elements in Biosamples.
I. Sziklai-Laszlo, and M. Ordogh. Jun 78, 12p
U.S. Sales Only.

Experiments were performed to eliminate the disturbing effect of exp 32 P when neutron activation analysis is used for the trace element analysis of biological materials. For this reason amorphous zirconium phosphate was selected and prepared by the authors. Retention factors better than 10 exp 2 were obtained using conventional batch techniques. The retention of Cr, Sb, Sc, Zn, Rb, Co and Fe were investigated in nitric acid media, and it was found to be less than 5%. Bowen's kale, dry potato powder and animal bone were analyzed. Some numerical results are given and gamma spectra are shown. (Atomindex citation 10:468673)

N80-22384/5 PC **A03**/MF **A01**
European Space Agency, Paris (France).
Biorack, a Spacelab Multipurpose Facility. Cell and Molecular Biology: Report on the Technical Feasibility Study.
8 Jan 80, 45p ESA-DP/ST(80)1

The scientific objectives, performance requirements, design characteristics, auxiliary equipment, crew training and development, and manufacture schedule of the Biorack research facility are analyzed. Fourteen representative candidate experiments on the influence of the space environment on living matter were selected to serve as reference experiments for the technical feasibility and cost study. It is shown that the necessary hardware can be accomodated in a single Spacelab rack. The single components are interchangable and allow a flexible approach to each mission and scientific requirement. The detailed design, development, manufacture, integration and testing of Biorack require approximately 35 months.

PAT-APPL-903 430 PC **A02**/MF **A01**
Department of the Interior, Washington, DC.
Spray Immunization of Fish.
Patent Application,
Robert L. Garrison, Rowan W. Gould, Patrick J. O'Leary, and John L. Fryer. Filed 8 May 78, 15p
PB80-181639
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention comprises an antigenic material useful for immunizing fish against disease and a spray method for administering the antigenic material to the fish. Accordingly it is an object of the invention to provide an antigenic material for the immunization of fish against disease and to provide a method for administering the antigenic material to fish efficiently and at low cost. Another object is to provide a method for administering the antigenic material to the fish by means of a spray.

PB80-176159 PC **A02**/MF **A01**
New England Botanical Club., Inc., Cambridge, MA.
Rare and Endangered Vascular Plant Species in Rhode Island.
George L. Church, and Richard L. Champlin.
1978, 23p
Prepared in cooperation with Fish and Wildlife Service, Newton Corner, MA.

The report documents the known status of rare, threatened or endangered vascular plants in the State of Rhode Island. The report is based on a thorough review of the literature, herbaria searches and field work for selected species. Approximately 120 species are listed with their habitats, distribution, known localities and pertinent comments on the species status.

PB80-176167 PC **A03**/MF **A01**
New England Botanical Club, Inc., Cambridge, MA.
Rare and Endangered Vascular Plant Species in Maine.
Final rept.,
Leslie M. Eastman. 1978, 41p

Prepared in cooperation with Fish and Wildlife Service, Newton Corner, MA.

The report documents the known status of rare, threatened or endangered vascular plants in the State of Maine. The report is based on a thorough review of the literature, herbaria searches and field work for selected species. Approximately 240 species are listed with their habitats, distribution, known localities and pertinent comments on the species status.

PB80-176571 PC **A10**/MF **A01**
Washington State Univ., Pullman. Coll. of Business and Economics.
Pacific Northwest Salmon and Steelhead Fishery Report. Volume I. The Economic Status of the Oregon and Washington Non-Indian Salmon Gillnet and Troll Fishery.
Interim rept. 1 Dec 78-30 Nov 79,
Glenn H. Petry. Jan 79, 203p PNRC-70501
Contract PNRC-10790005
See also Volume 2, PB80-176589.

The report includes a discussion of the factors that have reduced the number of salmon and steelhead in Washington, Oregon, and Idaho; future trends in these factors; history of the catch and license data in the sport and commercial salmon and steelhead fisheries; comparison of the profitability of commercial fishing with other types of small businesses; and an analysis of 1,225 questionnaires received from the Oregon and Washington commercial gillnet and troll salmon fishery. These commercial fishing questionnaires provided data on fleet characteristics, fishing effectiveness, fleet mobility, vessel use, gross receipts, costs and input purchases, dependence upon salmon fishing, net income, opinions on various issues in the fishery, and owner/operator characteristics. The reader should refer to Volume I for this information.

PB80-176589 PC **A07**/MF **A01**
Washington State Univ., Pullman. Coll. of Business and Economics.
Pacific Northwest Salmon and Steelhead Fishery Report. Volume II. The Economic and Employment Impacts Created by Commercial and Sport Salmon and Steelhead Fishing in the Pacific Northwest.
Final rept. 1 Dec 78-30 Nov 79,
Glenn H. Petry, Leroy L. Blakeslee, Walter R. Butcher, Russell J. Fuller, and Samih K. Staitieh.
Feb 80, 145p PNRC-70502
Contract PNRC-10790005
See also Volume 1, PB80-176571.

The primary purpose of this study is to determine the total economic impacts (both primary and secondary) caused by commercial and sport salmon and steelhead fishing in Washington, Oregon, and Idaho. Idaho has only a sport fishery while Oregon and Washington allow both sport and commercial fishing. Among the commercial fisheries, only the Indians are allowed to land steelhead. Although the study covers both the Indian and non-Indian fishery, only limited information will be given for the Indian sector because the tribes did not supply much information. Besides a substantial amount of data from the various state fishery agencies, the study incorporates information from ten other major studies involving input/output analyses, salmon processing, marine trade, and sport and commercial fishing.

PB80-177199 PC **A03**/MF **A01**
Zoological Society of San Diego, CA.
A Study of Serum Steroid Hormone Levels in Captive Female Bottlenose Dolphins, Their Correlation with Reproductive Status, and Their Application to Ovulation Induction in Captivity.
Final rept.,
Joan E. Sawyer-Steffan, and Vicky L. Kirby. May 80, 28p MMC-77/22
Contract MM7AC016

Little is known about reproductive endocrinology in captive Atlantic bottlenose dolphins (Tursiops truncatus). Conception is rare in captive animals. In order to artificially facilitate this provess, reproductive parameters were studied and manipulated in fully grown captive females greater than 9 years of age, 160 kg in weight, and 211 cms in length. Baseline serum levels of the steroid hormones progesterone and estrogen were determined for intact and ovariectomized captive females as well as newly captured wild adult females. Wild females were found to have twice the circulating estrogen levels of females held in captivity greater than five years. Stimulation of ovarian follicular growth and sexual receptiveness were attempted by intramuscular injection of pregnant mare serum gonadotropin. Relatively high doses of pregnant mare serum gonadotropin were found to increase serum estrogen levels and sexual receptiveness. Following these pregnant mare serum gonadotropin injections, human chorionic gonadotropin was injected and ovulation induced, as indicated by subsequent high levels of serum progesterone. From these observations, it appears that (1) the relative infertility of captive female dolphins to their wild counterparts may be due to a lack of ovarian activity; and (2) female captive dolphins, although relatively resistant to pregnant mare serum gonadotropin, can be induced to ovulate in captivity using a combination of relatively high intramuscular injected doses of pregnant mare serum gonadotropin followed by human chorionic gonadotropin.

PB80-177371 PC **A05**/MF **A01**
Montana Fish and Game Dept., Helena. Environment and Information Div.
Aquatic Studies of the Yellowstone River,
Patrick J. Graham, Russell F. Penkal, and Larry Peterman. Jul 79, 88p REC-ERC-79-8

This study is a continuation of earlier lower Yellowstone River studies to determine the effects of streamflow alterations on various fish populations. These studies are part of a large-scale effort by the Bureau to determine the availability of water from the Yellowstone River and its tributaries for use in developing coal resources in southeastern Montana. Since fish migration is related to spawning, feeding, over-wintering, and other biological activities, any diversion structure which would impede movement may restrict the biological activities needed for continued survival or abundance of a species. Data required for this determination are: (1) effects of a dam upon movement; (2) changes, if any, in biological activities of the species both above and below the diversion; and (3) if movement is restricted, how the population is affected. Walleye and sauger were studied in this phase of the project because they are important game fish and have a wide range. Results of data collected by personnel of the Montana Department of Fish and Game on the life history and distribution of these two species are documented.

PB80-180326 Not available NTIS
National Bureau of Standards, Washington, DC.
Simultaneous Determination of Mercury and Cadmium in Biological Materials by Radiochemical Neutron Activation Analysis.
Final rept.,
R. R. Greenberg. Apr 80, 4p
Pub. in Anal. Chem. 52, n4 p676-679 Apr 80.

A radiochemical procedure has been developed for the simultaneous determination of Hg and Cd in biological matrices. The procedure is based upon bomb dissolution followed by solvent extraction using Ni and Zn diethyldithiocarbamates. Mercury is separated from Se allowing the use of the (203)Hg isotope as well as the (197)Hg isotope to quantify Hg.

PB80-181043 PC **A03**/MF **A01**
Michigan State Univ., East Lansing. Inst. of Water Research.
Wastewater Recycling: Development of Plant Disease in an Old Field Ecosystem.
Project completion rept.,
K. Epstein, K. Ditz, and Gene R. Safir. Apr 80, 40p W80-04805, OWRT-A-097-MICH(1)
Contract DI-14-34-0001-8024

During 1978 and 1979, the threat of plant disease in a wastewater irrigation field dominated by goldenrod and quackgrass was assessed. Pathogens that were abundant in the wastewater irrigated areas, Coleosporium solidaginis, Erysiphe cichoracearum, Phyllachora graminis and Helminthosporium sp., alternate on economically important hosts. The increased disease in the irrigated areas seemed mainly due to moisture and disease severity was reduced by a midseason harvest. Levels of plant pathogens in the wastewater were apparently low since wounded seedlings of 12 varieties of 7 field crops soaked in wastewater remained healthy. There was no difference in the survival of Alternaria tensuis or Stemphylium sarcinaeforme after 24 days in filter sterilized wastewater or tapwater, but both Erwina herbicola and E. atroseptica survived better after 24 hrs in wastewater than in tapwater.

PB80-182884 PC **A08**/MF **A01**
Johns Hopkins Univ., Baltimore, MD. Chesapeake Bay Inst.
Terrestrial Ecological Survey of the Elm's Property, St. Mary's County, Maryland.
Special rept.,
M. Van Deusen, R. G. Otto, J. K. Mount, and L. S. Kaufman. Apr 79, 152p CBI-SR-71, REF-79-2

A terrestrial ecological survey of the Elms Property, St. Mary's County, Maryland was conducted during the 1978 field season. This thousand acre tract is part of the land bank of the Maryland Power Plant Siting Program. Vegetation was surveyed qualitatively to determine plant species present on the site and to identify primary biotopes: ponds, salt marsh, shrub swamp, managed fields and several types of coastal plain forest. Woody vegetation was analyzed semi-quantitatively to identify species assemblages. Soil, topography and water relations were identified as determinants of distributions of vegetative communities. Species composition and basic patterns of distribution and abundance were ascertained for birds, mammals, reptiles and amphibians. No species of threatened or endangered status are believed to inhabit the site.

PB80-186646 PC **A02**
Oregon State Univ., Newport. Marine Science Center.
Combined Effects of Temperature and Salinity on the Survival and Growth of the Larvae of 'Pandalus jordani' (Decapoda: Pandalidae),
P. C. Rothlisberg. c1979, 13p ORESU-R-79-022, NOAA-80043006
Grant NOAA-04-3-158-4
Pub. in Marine Biology, v54 p125-134 1979.

Survival and growth over an environmental range of temperature and salinities were examined in order to help assess the importance of these environmental factors in affecting the distribution, abundance and survival of larvae and provide greater understanding of factors affecting fluctuations in adult Pandalus jordani Rathbun population sizes. Larvae were shown to have a wide tolerance to salinity, especially in the early stages, but a relatively narrow tolerance to temperature. The optimal temperatures for survival, 8 to 11C, were also optimal for growth as reflected by maximal growth increments and body size. It is therefore felt that fluctuations in temperature as seen within and between successive larval seasons would have profound effects on larval survival, growth rates and size at metamorphosis to the benthic juvenile phase. (Copyright (c) by Springer-Verlag, 1979.)

PB80-186802 PC **A02**
National Marine Fisheries Service, Miami, FL. Southeast Fisheries Center.
Postlarval Shrimp (Penaeus) in the Florida Keys: Species, Size, and Seasonal Abundance,
Donald M. Allen, J. Harold Hudson, and T. J. Costello. Jan 80, 14p CONTRIB-70-09M, NOAA-80042302
Pub. in Bulletin of Marine Science, v30 n1 p21-33 Jan 80.

Postlarval shrimp of the genus Penaeus were sampled for 32 months (January 1966 to August 1968) at Whale Harbor Channel in the Florida Keys. Most of the postlarvae were pink shrimp Penaeus duorarum; the majority had three dorsal rostral spines and were approximately 7.5 mm total length. P. duorarum postlarvae occurred year-round but were generally most abundant from April to September. The seasonal high in postlarval abundance was probably related to the annual increase in water temperature on the offshore spawning grounds and to the annual rise in sea level in the Florida Bay area.

PB80-186976 PC**$6.00**/MF **A01**
Center for Disease Control, Atlanta, GA. Bureau of Labs.

Common Intestinal Helminths of Man: Life Cycle Charts,
Dorothy M. Melvin, M. M. Brooke, and E. H. Sadun. Apr 64, 30p HEW/CDC/BL-74/0002, DHEW/PUB/CDC-75-8286
See also PB80-186984.
Also available in set of 2 reports PC$8.00/MF$8.00, PB80-186968.

Sixteen basic life cycle diagrams of Nematode, Cestode and Trematode species which parasitize the human intestinal tract. The charts include fundamentals of the life cycles but omit details such as development time, environmental factors, alternate routes, and specific intermediate hosts.

PB80-186984 PC**$6.00**/MF **A01**
Center for Disease Control, Atlanta, GA. Bureau of Labs.
Common Intestinal Protozoa of Man: Life Cycle Charts,
M. M. Brooke, and Dorothy M. Melvin. Apr 64, 25p HEW/CDC/BL-79/0126, DHEW/PUB/CDC-79-8311
See also PB80-186976.
Also available in set of 2 reports PC$8.00/MF$8.00, PB80-186968.

Eleven basic life cycle charts of Amebae, Flagellates, Ciliate, and Coccidia that parasitize the human intestinal tract. The charts present the fundamentals of the life cycles but omit survival times, prepatent and patent periods and modes of transmission.

6E. Clinical Medicine

AD-A083 667/6 PC **A02**/MF **A01**
Boston Univ MA School of Medicine
Viability and Function of Outdated Human Red Blood Cells after Biochemical Modification to Improve Oxygen Transport Function, Freezing, Thawing, Washing, Postthaw Storage at 4 C, Perfusion in Vitro through a Bubble Oxygenator, and Autotransfusion,
C. R. Valeri, J. J. Vecchione, L. E. Pivacek, G. B. Lowrie, and R. M. Austin. 11 Nov 78, 10p
Contracts N00014-70-C-0111, N00014-79-C-0168
Pub. in Transfusion, v20 n1 p39-46 Jan-Feb 80.

No abstract available.

AD-A083 679/1 PC **A03**/MF **A01**
Naval Medical Research Inst Bethesda MD
Measurement of Lung Function Using Magnetometers II. Data Acquisition and Analysis.
Medical research progress rept.,
Donald L. Vawter. Nov 79, 41p Rept no. NMRI-79-79

A description of the software to analyze lung function using a spirometer-magnetometer system is presented. The software plots, compares, and processes the data and fits a variety of mathematical models to the data. The software package is designed for interactive use. A user guide is included. (Author)

AD-A083 736/9 PC **A03**/MF **A01**
Army Aeromedical Research Lab Fort Rucker AL
Aeromedical Aspects of CH-47C Helicopter Self-Deployment (Operation Northern Leap),
Lawrence R. Whitehurst, and Aaron W. Schopper. Mar 80, 50p Rept no. USAARL-80-1

A flight surgeon accompanied the first Army transatlantic helicopter flight to provide medical support and assess aircrew workload, stress and fatigue. Direct observation, interviews and questionnaires were used to gather data. Respiratory infections were experienced by approximately 50% of the mission crew during the 14 day journey. These were attributed to wide climate variations and inadequate crew rest during the first half of the mission. Daily pre-flight questionnaires showed highest levels of stress occurred at the start of the mission and decreased to a constant level once the mission was underway. Daily post-flight data demonstrated that cockpit workload increased appreciably with deterioration of weather during the latter part of the mission. Time at the flight controls and mission conditions during flight were found to be the greatest contributors to pilot fatigue; whereas, crew chiefs reported frequent time zone changes and poor facilities at stopover points to be their greatest causes of fatigue.

AD-A083 846/6 MF **A01**
Naval Medical Research Inst Bethesda MD
Summaries of Research - 1978.
Annual rept.
1978, 111p
Availability: Microfiche copies only.

This SUMMARIES OF RESEARCH is composed of citations to publications, an author index, and a subject index from the Naval Medical Research Institute for the calendar year 1978. (Author)

AD-A083 878/9 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Characterization of the Immunosuppressive State during Schistosoma mansoni Infection.
Medical research progress rept.,
A. M. Attallah, A. H. Smith, T. Fleischer, J. Woody, and Wilton E. Vannier. 12 Oct 78, 11p Rept no. NMRI-79-99
Pub. in Jnl. of Immunology, v122 n4 p1413-1420 Apr 79.

No abstract available.

AD-A083 880/5 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Isolation and Characterization of Surface Antigens from Schistosoma mansoni. I. Evaluation of Techniques for Radioisotope Labeling of Surface Proteins from Adult Worms.
Medical research progress rept.,
Eugene G. Hayunga, K. Darwin Murrell, David W. Taylor, and Wilton E. Vannier. 29 Dec 78, 12p Rept no. NMRI-79-105
Pub. in Jnl. of Parasitology, v65 n4 p488-496 1979.

No abstract available.

AD-A083 881/3 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Schistosoma mansoni: Immunization of Cynomolgus Monkeys by Injection of Irradiated Schistosomula.
Medical research progress rept.,
K. Darwin Murrell, Steven S. Clark, David A. Dean, and Wilton E. Vannier. 28 Jun 79, 9p Rept no. NMRI-79-109
Pub. in Experimental Parasitology, v48 p415-420 1979.

No abstract available.

AD-A083 910/0 PC **A04**/MF **A01**
Naval Medical Research Inst Bethesda MD
Measurement of Lung Function Using Magnetometers I. Principles and Mathematical Modeling.
Medical research progress rept.,
Donald L. Vawter. Nov 79, 55p Rept no. NMRI-79-78
See also AD-A083 679.

The use of magnetometer systems to predict pulmonary air volumes was studied. The sensitivity of the system to angular rotations was found to be small because magnetometers are normally mounted to the subject. Seven mathematical models for predicting volume were investigated, with the finding that two-parameter models are adequate for quiet breathing. For complicated maneuvers, a three-parameter model is necessary, and for predictive usefulness, the model must be calibrated using a complex maneuver. Results of studies of the dimensional changes, and the correlation between the dimensional changes, that occur during normal breathing are presented. (Author)

AD-A083 938/1 PC **A03**/MF **A01**
Georgetown Univ Washington DC Lombardi Cancer Center
Regulation of Immune Responses.
Interim rept. Mar 79-Mar 80,
Jerry A. Bash, and Philip L. Calcagno. 25 Mar 80, 47p Rept no. TR-3
Contract N00014-77-C-0748

Methods are being developed to allow us to indentify given antigen specific clones of cells by using antibodies against the cell surface receptors for that antigen. This technique will allow us to specifically delete clones of harmful cells, as in the case of graft versus host disease producing cells in the bone marrow transplant situation, or stimulate the specific clones of cells required for protective immunity against certain pathogens. In previous technical reports we have been able to show that antibodies can be prepared against cell receptors for histocompatibility antigens, and specific clones depleted, however the methods used to produce these antibodies were extremely complex and difficult to reproduce. Over the past year we have developed the ability to produce monoclonal antibodies against defined protein antigens as well as cell surface antigens. Some of these antibodies are capable of blocking antigen specific reactions and are being used to produce anti-idiotype antiboides on a large scale. The results of the latter series of experiments are not yet available as the immunization process takes many months. If the results show this process to be successful, then a simple widely applicable process will have been developed. Future studies will continue to define methods for clonal elimination and/or augmentation. (Author)

AD-A083 939/9 PC **A03**/MF **A01**
Georgetown Univ Washington DC Lombardi Cancer Center
Histocompatibility Typing.
Annual rept.,
David D. Eckels, and Philip L. Calcagno. 28 Mar 80, 42p Rept no. TR-3
Contract N00014-77-C-0747

This laboratory produced numerous advances in the understanding of HLA-D region immunogenetics. A number of new HLA-D specificities has been identified and our understanding of the interaction of HLA-D and HLA-DR has been furthered. Primed lymphocyte typing and methods of lymphocyte cloning are being developed. A new method of analyzing homozygous typing cell data was developed along with additional computer techniques. The effect of interferon on the immune system is being studied as it relates to the major histocompatibility complex mechanisms.

AD-A083 993/6 PC **A02**/MF **A01**
Georgetown Univ Washington DC Dept of Pediatrics
Effect of Microwaves on the Immune System.
Final rept. Mar 78-Nov 79,
Philip L. Calcagno, Allan H. Smith, K. Sulek, and W. Wiktor-Jedrzejczak. Mar 80, 8p
Contract N00014-78-C-0278

Microwave irradiation is an increasingly important environmental factor for both military and civilian populations. Because of numerous practical applications of MW, its use is widespread. Despite its immune system. Over the past year, we have been involved in evaluating particular reference to lymphocyte bearing complement receptors CR+. Initial studies established threshold requirements for changing the frequency of CR+ spleen cells with respect to intensity, wave length, duration and cumulative effect using a mouse model. Further, genetic factors were found to play a role in predisposing these animals to the effects of MW. We have expanded the observations of the MW effect on CR+ cells, initiated studies of other cells of the immune system and begun to genetically map these effects. In addition to the observed effect on CR+ cells of the spleen as we previously observed, we have now established CR+ cells increased in peripheral blood and lymphoid organs, but not in bone marrow cells. During the course of these investigations, it has been found that a number of other cell populations besides those carrying complement receptors are affected by MW exposure. For example, cells bearing Fc receptors are increased, natural killer cells are increased, and myeloid progenitor cells are affected by exposure to MW.

AD-A083 995/1 PC **A02**/MF **A01**
Maryland Univ Baltimore Dept of Microbiology
Studies on Trombiculid Mites (Chiggers) and Other Ectoparasites as Vectors of Rickettsial Infections.
Final rept. 1 Sep 69-30 Jun 77,
Charles L. Wisseman, Jr. Mar 79, 19p

Contract DADA17-70-C-0047
Report to the Commission on Rickettsial Diseases of the Armed Forces Epidemiological Board.

Research was carried out primarily on the ecology of chigger-borne rickettsiosis (scrub typhus) and the classification of trombiculid mites (chiggers). A total of 27 articles were published with the support of this contract and its predecessors. Included was a critical and extensive review of the ecology of scrub typhus. The demonstration that chiggers belonging to the vector-group of Leptotrombidium occur in the mountains of Ethiopia suggests that scrub typhus may exist there, although it has not yet been conclusively shown to be endemic anywhere in Africa. In the course of the investigations, data were obtained supporting the concept that chiggers are the actual reservoirs as well as the vectors of chigger-borne rickettsiosis. Thus, the infection is maintained in nature by transovarial transmission of rickettsiae from mother to offspring. However, the studies also indicate that under certain conditions (e.g., reattachment, or occasional acquisition of true infection), chiggers acquiring Rickettsia tsutsugamushi by feeding on rickettsemic hosts, may actually play a role in perpetuating the cycle or infecting another mammal. As emphasized in some of the articles published under these auspices, topography, geography and ecology are each insufficient to determine the endemicity of scrub typhus in any particular area in the continents where the rickettsiosis is known to occur.

AD-A084 020/7 PC **A03**/MF **A01**
Letterman Army Medical Center San Francisco CA
prophylactic Methods in the Prevention of Diseases among Army Personnel.
Annual progress rept. FY 1979,
Creed D. Smith, Robert S. Stewart, Ronald S. Shiromoto, and Angus C. Hull. Dec 79, 44p

This report describes the results to research methods of forecasting, detecting, and preventing upper respiratory and infectious diseases before they caused group illnesses in military populations, especially troop training units. Therefore, our greatest efforts have been directed toward those diseases that cause the largest loss of training days among recruits and advance trainees, and those that have the greatest potential of costing the government large amounts for hospitalizations or sick leaves. Such diseases are those caused by the Adenoviruses, Influenza, Mycoplasma, Coxsackieviruses, N. Meningitidis, and agents of Urethritis. A significant amount of effort has been directed towards prophylactic procedures. It is intended that the variety of approaches and techniques described herein will lead to further pathways even more effective in coping with these problems.

AED-Conf-77-100-001 MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Radiological-Morphological Synopsis of Radiation-Induced Lung Fibrosis.
G. Bublitz. 1977, 6p CONF-770270-1
In German.Scientific meeting of the norddeutsch roentgengesellschaft, Hamburg, F.R. Germany, 18 Feb 1977.
U.S. Sales Only. Microfiche copies only.

As delayed radiation damage after treatment of bronchial carcinoma and breast carcinoma, fibroses occur as a reaction of the tissues. They have become a clinical-functional syndrome because of their uniform clinicaL-radiological symptomatology and pathophysiology. Pulmonary fibrosis as delayed radiation damage has a special importance with its two different radiation effects on connective tissue: a) on existing structures, and b) delayed alterations of the connective tissue. As seen from experiments on lungs of men and rats, radiation-induced alterations can be measured by testing the different solubilities of the collagen types. In addition to the pathologically disordered collagen production, 9 weeks after the irradiation the radiation fibrosis leads to an isolated increase of insoluble collagen corresponding to the formation of metabolism-resistant fibrils. (Atomindex citation 09:395214)

AED-Conf-77-395-010 MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Computer-Tomographical Findings in Morbus Wilson.
D. Kuehne, and L. Lachenmayer. 1977, 3p CONF-7709129-8
In German.14. meeting of the deutsche gesellschaft fuer neuroradiologie, Koeln, F.R. Germany, 16 Sep 1977.
U.S. Sales Only. Microfiche copies only.

Four clinical pictures of Morbus Wilson are described. Presentation is done by computer tomography. Possible hereditary transmission is pointed out. (Atomindex citation 09:395237)

AED-Conf-77-461-035 PC **A03**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Improved Curve-Fitting, Parallelism Testing, Characterisation of Sensitivity and Specificity, Validation, and Optimization for Radioligand Assays.
D. Rodbard, P. J. Munson, A. DeLean, and Bethesda, Md. National Institutes of Health. 1977, 37p CONF-7710167-40
Symposium on radioimmunocassey and related procedures in medicine, Berlin, F.R. Germany, 31 Oct 1977.
U.S. Sales Only.

A new computer program has been developed to simultaneously 'fit' a family of curves, based on the four parameter logistic equation. This provides an optimal test of 'parallelism', permits estimation of shared parameters based on all of the available data, and provides 'combined potency estimates'. Several simple general methods have been developed to permit testing of 'parallelism' of standard and unknown preparations, irrespective of the method used for dose interpolation. The use of the mass-action law equations to describe RIA dose response curves and for dose interpolation, has been extented to apply to cases involving up to three independant classes of sites (one 'non-saturable'), corresponding to a 5 parameter Scatchard plot model. We discuss a statistically meaningful definition of the minimal detectable dose in an assay. Simple computer programs have been developed for analysis of the typical 'recovery' experiment, i.e. when graded doses of unlabeled ligand are added to serum, to test the validity of the assay. A new program has been developed, to provide least squares estimation of parameters for the association and dissociation kinetics of RIA and radioreceptor assay systems, based on simlutaneous analysis of all relevant data. Improved programs have been developed for optimization of conditions of RIAs employing delayed addition of labeled ligand. (Atomindex citation 09:391830)

AED-Conf-77-461-041 MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Radioimmunological Encephaline Test.
P. Pradelles, C. Gros, C. Rougeot, O. Bepoldin, and F. Dray. 1977, 11p CONF-7710167-39, IAEA-SM-220/67
In French.Symposium on radioimmunocassey and related procedures in medicine, Berlin, F.R. Germany, 31 Oct 1977.
U.S. Sales Only. Microfiche copies only.

The recent discovery of substances able to compete with opiates for morphine-specific binding sites in the brain has opened up a new path for studying the made of action of these receptors. These morphinomimetic substances known as endorphines might be the precursors of smaller molecules, e.g. encephalines, two pentapeptides (H-Tyr-Gly-Gly-Phe-Met-OH or Met-Enc and H-Tyr-Gly-Gly-Phe-Leu-OH or Leu-Enk) which serve as neurotransmitters of the analgesic effect. A radioimmunoassay has been developed with the aim of measuring the distribution of these substances in the brain and of following their development in different states of psychopathology. (Atomindex citation 09:391829)

CEA-N-2017 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Protection.
Laboratory Animals Pulmonary Clearance Study with Chromium 51 Labelled Polystyrene Spherical Particles: Investigations for Clinical Application.
M. Roy, H. Metivier, R. Masse, J. C. Nenot, and J. Lafuma. Feb 78, 23p
In French.
U.S. Sales Only.

Polystyrene spherical particles labelled with chromium 51, retaining a small amount of chromium acetylacetonate, were administered through different ways to laboratory animals, mice, rats, dogs and monkeys, in order to work out a suitable technique for clinical investigations. The following results were obtained: radioactive labelling may be considered as stable because in vivo chromium elution from the particles does not exceed 0.1% daily. No short-term toxicity has been found for any of the ways of administration due to acetylacetonate or the particles themselves. Long-term pulmonary clearance of inhaled polystyrene particles is close to that of metallic oxides, and no detectable nuisance was observed. (Atomindex citation 09:414616)

CONF-790783-1 PC **A03**/MF **A01**
Chicago Univ., IL.
Applications of ROC Analysis in Diagnostic Image Evaluation.
C. E. Metz. 1979, 27p
Contract EY-76-C-02-0069
AAPM summer school on recording system measurements and techniques, Chapel Hill, NC, USA, 22 Jul 1979.

The need for Receiver Operating Characteristic (ROC) analysis is indicated by a discussion of the limitations of accuracy and of sensitivity and specificity as indices of diagnostic detection or discrimination performance. The concept of a variable decision threshold is shown to lead in a natural way to the ROC curve as a means for specifying diagnostic performance. Practical techniques for measuring ROC curves are described, and directions for possible generalizations of conventional ROC analysis are indicated. (ERA citation 05:016752)

HRP-0030628/2 PC **A25**/MF **A01**
Health Systems Agency of Southwestern Pennsylvania, Inc., Pittsburgh.
Health Systems Plan for 1979-1980. Health Service Area 6 Pennsylvania. Volume I. Second Edition.
Mar 79, 597p
See also HSP Volume 2, HRP-0901651; HSP Volume 3, HRP-0901650; AIP, HRP-0030775.

The introduction to this health systems plan (HSP) developed by the Health Systems Agency of Southwestern Pennsylvania examines the mandate of the agency, the health service area, the planning process and participation, procedures for amending the HSP, and the relationship between the HSP and Federal and State priorities. A regional profile of the health service area is presented that contains geographic, demographic, socioeconomic, health status (mortality), and health system (institutional and manpower resources and medically underserved areas) information. The health planning priority ranking process is detailed. Health status problem summaries are given for ischemic heart disease, neonatal mortality, lung cancer, mental retardation due to organic causes, cerebrovascular disease, and cirrhosis of the liver. The health system is analyzed in relation to community health promotion and protection (environmental quality management, health education, and nutrition education) and prevention and detection (family planning, prenatal care, immunization, and fluoridation).

HRP-0030775/1 PC **A08**/MF **A01**
Health Systems Agency of Southwestern Pennsylvania, Inc., Pittsburgh.
Annual Implementation Plan for 1979-1980. Health Service Area 6 Pennsylvania.
Mar 79, 172p
See also HSP Volume 1, HRP-0030628; HSP Volume 2, HRP-0901651; HSP Volume 3, HRP-0901650.

This annual implementation plan (AIP) of the Health Systems Agency of Southwestern Pennsylvania specifies short-term goals, objectives, recommended actions, and resource requirements for selected components of the health systems plan. Three major areas of the AIP are community health promotion and protection (environmental quality management and health education); prevention and detection (family planning, prenatal care, im-

munization, and fluoridation); and diagnosis and treatment (regional diagnostic radiology, therapeutic radiology, emergency medical services, regionalized home health care, adult general medical-surgical services, regionalized obstetrical care, pediatric services, regionalized burn care, surgical services, mental disabilities services, regionalized ambulatory care, adult long-term institutional care, and end-stage renal disease care). All components of the AIP are updated annually and are revised in accordance with the receipt of more current information and the completion of more detailed planning.

HRP-0900623/0 PC **A05**/MF **A01**
Veterans Administration Hospital, San Francisco, CA.
Primary Care Judgments of Nurses and Physicians. Volume 4. Reliability and Validity Research Report,
Frank E. McLaughlin, John W. Carr, and Kevin L. Delucchi. Jul 79, 80p
Grant PHS-NU-00751
See also Volume 3, HRP-0900607.

A comprehensive report of the investigation into the validity and reliability of the Clinical Simulation Tests for hypertension and chronic obstructive pulmonary disease, as developed by the Primary Care Judgments of Nurses and Physicians Research Project, is presented. The three-volume series containing the details of the project, to which this report is a supplement, cited partial support for the reliability and validity of the simulation tests. Data reported in this study were gathered from a variety of sources and examined in the following ways: (1) by a comparison of the original panel of experts with a second panel; (2) two statistical procedures comparing test scores of the same subjects obtained at two different times; (3) by a comparison of test contents with authoritative literature on the disease model; (4) by a comparison of test results from professional groups of subjects and from pre-professional groups; and (5) through examination of the evaluation of the test by different groups of test takers. The following conclusions were reported: (1) the expert panels for both simulation tests do represent the larger population of experts, and their scores do serve as valid criteria for scoring purposes; (2) both of the tests have high test-retest reliability; (3) both of the tests conform to clinical simulation models, primary care issues and procedures, and tests reported in the health care literature; and (4) both simulation tests possess construct validity, and the proficiency scoring technique adequately allows for discrimination based on level of ability to provide primary care.

HRP-0901551/2 PC **A03**/MF **A01**
Southern Piedmont Health Systems Agency, Inc., Charlotte, NC.
Health Systems Plan for 1979-1983. Health Service Area 3 North Carolina. Summary. Second Edition.
1979, 40p
Grant PHS-04-P-000222-03
See also AIP, HRP-0901552, and HSP, HRP-0901572.

The health systems plan of the Southern Piedmont Health Systems Agency in Charlotte, N.C., intended to promote optimum health for residents, is summarized. An effort is made to highlight primary concerns related to cardiovascular and cerebrovascular disease, cancer, sexually transmitted disease, death and disability from violent causes, infant and fetal deaths, diabetes, arthritis, genetic disease, health education, environmental health, family planning, dental health, immunization, nutrition, hospitals, primary care, emergency medical services, mental health, chronic renal disease, long-term care, rehabilitation hospital services, homes for the elderly, and home health care. Goals, objectives, and recommended actions are enumerated for each component of the health systems plan. An overview of the eight-county health service area encompasses geographic, economic, demographic, and social characteristics of residents.

HRP-0901552/0 PC **A04**/MF **A01**
Southern Piedmont Health Systems Agency, Inc., Charlotte, NC.
Annual Implementation Plan for 1979-1980. Health Service Area 3 North Carolina.
1979, 65p
Grant PHS-04-P-000222-03
See also HSP Summary, HRP-0901551, and HSP, HRP-0901572.

This annual implementation plan (AIP) prepared by the Southern Piedmont Health Systems Agency in Charlotte, NC, defines short-range objectives and recommended actions to improve health status and the health system. Introductory comments focus on the AIP's basis and purpose, scope and limitations, format, plan development policies, and the procedures for revising and amending the AIP. The following areas are cited: cardiovascular and cerebrovascular disease, cancer, diabetes, health education, environmental health, family planning, dental health, immunization, nutrition, hospitals, primary care, emergency medical services, mental health, mental retardation, alcohol and drug abuse, long-term care, and home health care. A summary status report on the implementation of the previous AIP is appended.

HRP-0901572/8 PC **A23**/MF **A01**
Southern Piedmont Health Systems Agency, Inc., Charlotte, NC.
Health Systems Plan for 1979-1983. Health Service Area 3 North Carolina. Second Edition.
1979, 527p
Grant PHS-04-P-000222-03
See also AIP, HRP-0901552, and HSP Summary, HRP-0901551.

Major elements of the health systems plan (HSP) devised by the Southern Piedmont Health Systems Agency in Charlotte, N.C., are detailed. The introduction contains a description of the health service area, such as geographic, topographic, geologic, and climatic features, and socioeconomic characteristics of residents such as ethnic composition, age, education, and employment. Information on community health status is presented in the form of goals, objectives, and action steps for cardiovascular disease, cerebrovascular disease, cancer, sexually transmitted disease, death and disability from violent causes, infant and fetal deaths, diabetes mellitus, arthritis and rheumatism, and genetic disease. Goals, objectives, and action steps are also indicated for the health system: health promotion and protection (health education and environmental health); prevention and detection (family planning, dental health, immunization, and nutrition); diagnosis and treatment (hospitals, primary care, emergency medical services, mental health, and chronic renal disease); habilitation and rehabilitation (long-term care); and maintenance (homes for the elderly and home health care). A glossary and index are provided. Appendixes note criteria and standards for computerized tomography and megavoltage radiation therapy facilities, health care expenditures for the health service area in 1976, and the HSP goal and objective prioritization process.

HRP-0901575/1 PC **A15**/MF **A01**
Merrimack Valley Health Planning Council, Inc., Lawrence, MA.
Health Systems Plan and Annual Implementation Plan for 1979. Health Service Area 3 Massachusetts. 2nd Edition.
Jan 79, 347p
Grant PHS-01-P-000070-03-0

The combined health systems plan (HSP) and annual implementation plan (AIP) of Massachusetts' Merrimack Valley Health Planning Council, Inc., are presented. Prefatory sections of the HSP focus on the plan revision process, procedures for revising the HSP, and characteristics of the health service area (geography, climate, population, transportation, and economy). The health status section encompasses mortality, ischemic heart disease, cancer, cerebrovascular disease (stroke), accidents, diabetes mellitus, cirrhosis of the liver, arteriosclerosis, bronchitis, emphysema, asthma, influenza and pneumonia, homicide and suicide, accidents caused by fire and flames, productive years lost, infant and neonatal mortality, prematurity, communicable diseases, tuberculosis, alcoholism, nonfatal motor vehicle accidents, smoking, and nutrition. Health system components are primary prevention, environmental and occupational health, primary and ambulatory care, emergency medical services, acute care, specialty care services, postacute care, mental health and mental retardation, and substance abuse, and financing. Goals, objectives, and recommended actions for health status and the health system are specified. HSP priority goals included in the AIP are primary ambulatory care, mental health, acute care, emergency medical services, postacute care, and prevention.

HRP-0901623/9 PC **A23**/MF **A01**
Health Systems Agency of Western New York, Inc., Buffalo.
Health Systems Plan 1979. 3rd Edition.
Mar 79, 547p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.Portions of this document are not fully legible.

The Health Systems Agency of Western New York is a private non-profit corporation organized and funded under the provisions of the National Health Planning and Resources Development Act of 1974. The Health Systems Agency of Western New York (HSAWNY) carries out planning, regulatory and development activities for a broad range of health and health-related services within the area comprised of the counties of Allegany, Cattaraugus, Chautauqua, Erie, Genesee, Niagara, Orleans, and Wyoming. HSAWNY is governed by a 79 person Board of Directors representing each of the eight counties in its service area. The directors are either appointed by county government, elected by county level subarea advisory councils, or elected at-large. A majority of the membership of the Board are health care consumers, broadly representative of the social, economic, linguistic, and racial characteristics of the region. The Board of Directors operates through an Executive Committee of 25 Directors, several standing committees, and a professional staff. The activities of HSAWNY are augmented by eight subarea advisory councils, which in addition to electing members of the Board of Directors, also carry out planning, review and development activities.

HRP-0901650/2 PC **A24**/MF **A01**
Health Systems Agency of Southwestern Pennsylvania, Inc., Pittsburgh.
Health Systems Plan for 1979-1980. Health Service Area 6 Pennsylvania. Volume 3. Second Edition.
Mar 79, 555p
See also HSP Volume 1, HRP-0030628; HSP Volume 2, HRP-0901651; AIP, HRP-0030775.

This third volume of the health systems plan (HSP) for residents served by the Health Systems Agency of Southwestern Pennsylvania specifies goals and objectives pertinent to regional health care issues. Details are provided for organizational, planning, and financing aspects of burn care, surgical services, open heart surgery, mental disabilities, primary ambulatory care, adult long-term institutional care, habilitation and rehabilitation, habilitation of developmental disabilities, maintenance (homemaker and chore services and end-stage renal disease care), personal health care support, and health system enabling functions (coordinated planning). Activities related to the implementation of the HSP are summarized as they concern community health promotion and protection, prevention and detection, diagnosis and treatment (long-term care, burn care, end-stage renal disease care, obstetrical care, emergency medical services, capital improvements, reimbursement, and health maintenance organizations), and other aspects of health status and the health system.

HRP-0901651/0 PC **A99**/MF **A01**
Health Systems Agency of Southwestern Pennsylvania, Inc., Pittsburgh.
Health Systems Plan for 1979-1980. Health Service Area 6 Pennsylvania. Volume 2. Second Edition.
Mar 79, 619p
See also HSP Volume 1, HRP-0030628; HSP Volume 3, HRP-0901650; AIP, HRP-0030775.

This second volume of the health systems plan (HSP) prepared by the Health Systems Agency of Southwestern Pennsylvania contains information relevant to improving the health system for area residents. The emphasis is on diagnosis and treatment, dealing with generic problems such as health status, the allocation of services to meet needs, physical and financial accessibility, the cost of diagnosis and treatment services, and clinical

research. Of equal importance are the development of a regional diagnostic radiology action plan (cardiac catheterization and coronary arteriographic services and alternatives to cardiac catheterization), computerized tomography, therapeutic radiology, the development of a regional emergency medical services action plan, a home health services action plan, inpatient acute care (adult medical-surgical services), regionalized obstetrical care, and pediatric services. Goals and objectives, accompanied by associated resource requirements for their achievement, are stipulated for these areas of the health system.

HRP-0901659/3 PC **A18**/MF **A01**
Middle Tennessee Health Systems Agency, Inc., Nashville.
Health Systems Plan. Health Service Area 4 Tennessee. Second Edition.
Nov 78, 417p

The Middle Tennessee Health Systems Agency prepared this health system plan (HSP), which begins with introductory remarks about the structure and legal background of the health systems agency, the purpose and scope of the HSP, the plan methodology, plan development, priorities, national health planning guidelines, and procedures for reviewing and amending the HSP. It provides a description of the health service area that notes sociodemographic characteristics and includes maps. Health status is examined in relation to cancer, cardiovascular disease, diabetes, end-stage renal disease, bronchitis, asthma, emphysema, maternal and child health, communicable diseases, and violent deaths. The health system is analyzed with regard to economic issues, physical health (e.g., emergency services, community health education, forensic pathology and toxicology, and home health care), mental health, mental retardation, and alcohol and drug abuse; and environmental and occupational health. Goals, objectives, recommended actions, and resource requirements relevant to health status and the health system are specified. Additional information on health services and problems addressed in the HSP is appended. A glossary and an index are provided.

HRP-0901757/5 PC **A22**/MF **A01**
Texas Statewide Health Coordinating Council, Austin.
The Texas State Health Plan for 1979.
26 Jan 79, 511p TX-00-72-02
Grant DHEW-06-P-000207-03

This health plan identifies statewide health concerns and proposes solutions that will improve the health status of Texas residents. Background information describes the mission of the state coordinating council, priority health concerns, the authority and responsibility for health planning, the organizational structure for health planning, the purpose of the State health plan, and the plan development process. Information on demographic, socioeconomic, and health status characteristics of the population is presented. Remaining sections of the plan deal with physical and mental health (infant mortality, communicable disease, cancer, cardiovascular conditions, developmental disabilities, alcoholism, drug abuse, mental health, dental conditions, nutritional conditions, diabetes mellitus, mental retardation, motor vehicle accidents, kidney conditions, respiratory conditions, vision and hearing conditions, and arthritis), the environment (water quality, solid waste disposal, air quality, education, occupational safety and health, and sociocultural factors), and other health-related concerns (financing, personnel, planning coordination, legislation, and research). Goals, objectives, and recommended actions relevant to health status and the health system are delineated. Additional information on statewide health concerns is provided in appendixes. References are cited.

HRP-0901794/8 PC **A06**/MF **A01**
Health Planning Council for Greater Boston, Inc., MA.
Annual Implementation Plan for 1979-1980. Health Service Area 4 Massachusetts.
1979, 119p
See also HSP, HRP-0901795.

The Health Planning Council for Greater Boston, Mass., prepared this annual implementation plan (AIP). It begins with an introduction to AIP objectives, actions requested by the State health planning and development agency to achieve objectives, and required resources. The prior AIP is assessed, and the current AIP is evaluated in terms of components selected from the health systems plan. The format of AIP objectives and action plans notes health systems plan goals and the feasibility of and rationale for objectives and action plans. Priority areas addressed in the AIP include ambulatory primary care, acute inpatient care, postacute/long-term care, mental health and mental retardation, prevention and health promotion, environmental health, occupational health, health manpower, health care financing, and substance abuse.

HRP-0901795/5 PC **A16**/MF **A01**
Health Planning Council for Greater Boston, Inc., MA.
Health Systems Plan. Health Service Area 4 Massachusetts. 2nd Ed.
Annual rept. no 1 (Update).
Feb 79, 355p
See also AIP 1978-80, HRP-0901794.

The Health Planning Council for Greater Boston, Mass., prepared this health systems plan (HSP). The introduction to the HSP lists functions of the health systems agency and the role of the HSP in achieving health status and health system goals and objectives. Health status is evaluated in relation to population characteristics and measures of health status, such as mortality in general, infant mortality, live births, immature birth rates, age-adjusted death rates, communicable diseases, disease versus immunization, and practicing primary care physicians. Components of the health system are analyzed, including ambulatory primary care, acute inpatient care, postacute/long-term care, mental health and mental retardation, prevention and health promotion, environmental health, occupational health, health manpower, health care financing, substance abuse, and emergency medical services. A glossary and an executive summary of the original HSP are included. Public testimony presented in the course of developing the HSP is contained in appendixes. A map of the area served by the agency is also included.

HRP-0901806/0 PC **A25**/MF **A01**
East Kentucky Health Systems Agency, Inc., Winchester.
Health Systems Plan. Health Service Area 2 Kentucky. Appendix A-P. 2nd Edition.
16 May 79, 593p
See also AIP 1979-1980, HRP-0901807, and HSP 1979-1983, HRP-0901808.

Appendixes contain additional information on the health systems plan developed by the East Kentucky Health Systems Agency, Inc. Narrative and statistical data are provided for the following areas and components of the health systems plan: Federal, State, and health systems agency priorities; plan coordination; preliminary guidance on the plan development process (area-level analysis and planning, State-level policy analysis, State-level planning, plan data requirements, statewide needs and priorities, coordination of the planning process, plan integration, areas for revision, and the State medical facilities plan); health education (community health education and school health education); prevention and detection (immunization and screening); and specific health systems plan components (dental health, malignant neoplasms, cardiovascular disease, maternal and infant health care, primary care services, acute inpatient care, long-term care services, community mental health center services, cardiac special care, radiation therapy, and computed tomography scanner services).

HRP-0901807/8 PC **A04**/MF **A01**
East Kentucky Health Systems Agency, Inc., Winchester.
Annual Implementation Plan for 1979-1980. Health Service Area 2 Kentucky.
16 May 79, 52p
Contract PHS-04-P-000258-03-0
See also HSP 1979-1983, HRP-0901808, and HSP Appendix A-P, HRP-0901806.

The annual implementation plan (AIP) of the East Kentucky Health Systems Agency, Inc., lists changes in the health system to improve the health status of the population. The format of the AIP includes objectives, short-range recommended actions, required resources, discussion of objectives, and references to the health systems plan. An introductory section examines the relationship between the AIP and the health systems plan and focuses on the content of the AIP. Subsequent sections deal with the AIP development process, criteria for the selection of AIP objectives, plan review and evaluation, procedures for the amending the AIP, and responsibility for plan implementation. AIP objectives, strategies, and resources are stipulated for community health, prevention and detection, diagnosis and treatment, and acute care. Specific objectives concern health education, immunization, water supplies, dental care and dental hygiene education, cancer screening, hypertension programs, the establishment of a perinatal network statewide, neonatal special care units, maternal clinic services, primary care services, specialized diagnostic and treatment services, emergency medical transportation services, emergency communications, cardiopulmonary resuscitation, developmentally disabled persons, and senior citizens.

HRP-0901808/6 PC **A08**/MF **A01**
East Kentucky Health Systems Agency, Inc., Winchester.
Health Systems Plan for 1979-1983. Health Service Area 2 Kentucky. 2nd Edition.
16 May 79, 175p
Contract PHS-04-P-000258-03-0
See also HSP Appendix A-P, HRP-0901806, and AIP 1979-1980, HRP-0901807.

Goals, objectives, and recommended strategies articulated in this health systems plan prepared by the East Kentucky Health Systems Agency, Inc., are presented to serve as the foundation for planning to meet the needs of residents in the health service area. Introductory comments focus on the legislative authority for health planning and the operation of the health systems agency. Consideration is then given to planning principles and the plan development process and framework. A description of the health service area is presented that notes geographic, demographic, and socioeconomic characteristics of residents. Health status is evaluated in relation to mortality, infant mortality, other causes of death, and morbidity (acute and chronic conditions). The health system is assessed with regard to community health promotion and protection (health education, environmental health, and occupational safety and health); prevention and detection (immunization, dental prevention, and screening); diagnosis and treatment (e.g., maternal and infant care, primary care, and acute care); habilitation and rehabilitation; maintenance services; personal health care support services; and health system enabling services. Resources needed to achieve goals and objectives of the HSP are listed, and attention is given to project review standards, HSP implementation, and HSP assessment. Health policy statements are included. A glossary and an index are provided.

HRP-0901908/4 PC **A03**/MF **A01**
Health Planning Council of the Midlands, Omaha, NE.
Annual Implementation Plan for 1979. Health Service Area 3 Nebraska.
15 Mar 79, 41p
See also HSP 1979-1984, 2nd Edition, HRP-0901909.

The annual implementation plan (AIP) to meet the needs of residents served by Nebraska's Health Planning Council of the Midlands begins with introductory remarks about action steps in the AIP that reflect goals of the health systems plan, options available for implementing the AIP, and recommended actions of the health systems plan that are addressed in the AIP. Priority areas in the health systems plan are (1) medical-surgical bed capacity, pediatric bed capacity, physical and economic health care accessibility, and primary care; (2) teenage pregnancies, mental health, and treatment outcomes, medically needy persons, immunizations, primary medical care shortages, critical care, health education, and emergency medical services; and (3) coordination of home health, technology, long-term care, mental health system

integration, rural obstetrical services, urban obstetrical services, obstetrical bed capacity, dental shortages, and homemaker-home health aides. Objectives, recommended actions, and resource requirements are indicated for acute care bed need determination (medical-surgical services and pediatric services), primary health care services and shortages, mental health, drug abuse and alcoholism, immunization, family planning, critical care services, emergency medical services, and home health and community nursing services. A tentative list of potential sponsors for achieving AIP objectives is provided in an appendix.

HRP-0901909/2 PC **A19**/MF **A01**
Health Planning Council of the Midlands, Omaha, NE.
Health Systems Plan for 1979-1984. Health Service Area 3 Nebraska. Second Edition.
1979, 437p
See also AIP 1979, HRP-0901908.

Health status and health system are the focus of this health systems plan (HSP) devised by Nebraska's Health Planning Council of the Midlands. The introduction provides information on the statutory authority of the health systems agency for health planning, responsibilities and policies of the agency, the HSP's purpose and use, its structure, and planning philosophy and policy. The health service area is described in terms of demographic, social, economic, and geographic characteristics. Health status is examined in relation to mortality indicators, (e.g., heart disease, malignant neoplasms, myeloid leukemia, and tumors); environmental indicators, (e.g., noise exposure reduction, particulate air pollution reduction, and typhoid fever); and health status priorities and criteria for setting priorities. The health system is analyzed in relation to community health promotion and protection, (e.g., health education, environmental quality management, and occupational safety and health); prevention and detection (venereal disease and family planning); diagnosis and treatment (e.g., pediatrics, obstetrics, surgical services, and diagnostic radiology); habilitation and rehabilitation (developmental disabilities and therapy); maintenance services (e.g., home health and community nursing and homemaker-home health aides); personal health care support services, and health system priorities. Long-range recommended actions and resource requirements are stipulated for health status and health system goals.

HRP-0902060/3 PC **A06**/MF **A01**
JWK International Corp., Annandale, VA.
Evaluation of Impact of P.L. 94-484 (Capitation 771 (C)) on the Distribution of Residencies in Direct and Affiliated Hospitals, 1977 and 1978.
Final rept. 21 Sep 78-21 Oct 79.
26 Nov 79, 104p
Contract PHS-HRA-232-78-0133

Since experiences in residency training are highly predictive of the type of clinical practice physicians will eventually choose, residency programs are increasingly identified as primary sources of data needed for physician manpower analysis and projections. The capitation grant applications starting in 1977 provide the number of first-year residents in training in primary and nonprimary care specialties which is potentially useful for developing medical manpower projections. The purpose of this study is to (1) evaluate the accuracy of resident counts in the capitation grant data base and (2) assess the usefulness of employing first-year attrition from primary care to project the ratio of primary to nonprimary care physicians expected to go into practice.

HRP-0902061/1 PC **A02**/MF **A01**
Indiana Health Careers, Inc., Indianapolis.
Indiana Operation MEDIHC (Military Experience Directed into Health Careers). Executive Summary of the Final Report.
Final rept. 1 Oct 77-12 Sep 79.
1979, 8p
Contract PHS-HRA-231-77-0047
See also HRP-0902069.

Indiana Operation MEDIHC (Military Experience Directed into Health Careers) was the project conducted in Indiana by Indiana Health Careers, Inc. in cooperation with the Department of Health, Education and Welfare, Public Health Service. The project developed and extended various services to ease the transition of Vietnam-era Veterans with health care training, experience or interest into health related jobs or education and training or both in the civilian sector.

HRP-0902069/4 MF **A01**
Indiana Health Careers, Inc., Indianapolis.
Indiana Operation MEDIHC (Military Experience Directed into Health Careers). Final Report.
Final rept. 1 Oct 77-14 Sep 79.
1979, 63p
Contract PHS-HRA-231-77-0047
See also Executive Summary, HRP-0902061.

The project developed and extended the various services necessary to counsel Vietnam-era Veterans who had training, experience or interest in the field of health into health related jobs or education and training or both in the civilian sector. It was first necessary to identify key obstacles inherent in the health care delivery system and effectively counteract those which impeded the veteran's transition. Initial concerns included: (1) Identification of the 'about to be' separated Vietnam-era Veteran while still in the military in order to apprise him/her of the availability of the services. (2) Enrollment of those who responded. (3) Evaluation and interpretation of the veterans qualifications to potential employers i.e. translating or equating MOS to civilian credentials. (4) Influencing education institutions to accord adequate credit for military training/experience. (5) Influencing the development of new education programs (e.g. physician's assistant). (6) Redesigning staffing patterns for prisons to incorporate the specific qualifications of separatees into state manning tables. Programs and services were developed, continued and discontinued as appropriate to overcome the obstacles. Of the 2565 veterans who received extended services, 758 were placed into full-time employment and 387 were admitted into formal education and training programs. Approximately 85% of those veterans were still in the same job or education program six months and one year after the initial placement.

HRP-0902070/2 PC **A02**/MF **A01**
Pennsylvania Univ., Philadelphia. Emergency Medical Services.
Proposal Development: Instructor's Manual,
C. Gene Cayten. 1979, 25p
Sponsored in part by Bureau of Health Professions, Hyattsville, MD.

The material prepared for this module and others found in the curriculum is intended primarily for incumbent EMS administrators who oversee the coordination of an emergency medical services system or who oversee some aspect of systems operation. Program participants will therefore be familiar with the basics of emergency care services but will have varied backgrounds in respect to education and experience. The module that follows is provided to increase the knowledge and skills of incumbent EMS administrators with its focus on one particular aspect of EMS systems. In the section entitled 'Scope', a description of the module's topical area is presented and states what is covered and why it is important. Instructional objectives are offered which you can utilize to aid in your organization of the material. The outline, exercises, bibliographies, and appendicies are intended as a guide which offers methods for demonstrating the topics relevant to the module. The questionnaires can be used by you for evaluating the performance of the trainee after the course is completed.

HRP-0902071/0 PC **A04**/MF **A01**
Pennsylvania Univ., Philadelphia. Emergency Medical Services.
Data System Development for Planning, Management and Evaluation: Student Manual,
C. Gene Cayten. 1979, 66p
Sponsored in part by Bureau of Health Professions, Hyattsville, MD.

Intelligent planning depends on a solid information base. In the implementation of an EMS system, administration must make a thorough assessment of existing resources, identify needs and implementation strategies, and develop an ongoing mechanism for program review and evaluation. Ongoing generation of data is essential to the success of these activities. The EMS administration must, therefore, implement means for continual data gathering. The primary methods are reporting forms (dispatch, ambulance, emergency department) containing significant data items with the potential of being linked for any individual emergency event. Useful data for system organization is also derived from special studies and surveys and numerous external sources that compile demographic and health statistics information. This unit outlines the basic data requirements for an EMS system and explores in detail four methods for data gathering (surveys, interviews, record review and participant observation). These methods are then specifically applied to fundamental EMS planning and implementation situations.

HRP-0902076/9 PC **A04**/MF **A01**
Colorado Hospital Association, Denver.
Colorado Expanded MEDIHC Effort.
Final rept.,
Tom R. Sangster, and Lucinda A. Dummer. 25 Feb 80, 53p
Contract PHS-HRA-232-78-0094

The Colorado Expanded MEDIHC Effort Comprehensive Report covers the program's efforts to provide a state focal point of advice and assistance to allied health personnel seeking employment in the underserved health areas of Colorado during the period of January 1, 1979 through December 31, 1979. The arrangement of the Comprehensive Report follows. Chapter I is a summary of the program's operations and outcomes relating to the contract objectives. Chapters II-IV present applicant flow through the counseling and placement programs and the results of these processes as reported at twelve month intervals. Restraints experience in employment are reported in Chapter V. Projects that contribute to the constant flow of civilians and veterans seeking assistance from MEDIHC are described in Chapter VI. Methods for identifying shortage areas and occupations are described in Chapter VII. The final chapter of the report covers administrative meetings attended by the MEDIHC staff.

HRP-0902077/7 PC **A06**/MF **A01**
Professional Examination Service, New York.
Correlation of Performance on Clinical Laboratory Proficiency Examinations with Performance in Clinical Laboratory Practice.
Final rept. 1 Oct 77-31 Jul 79,
Craig G. Schoon, Maureen Kaley, and Ina Stern. Jul 79, 107p
Contract PHS-HRA-231-77-0118
See also Executive Summary, HRP-0902078.

The purpose of the present research was to investigate the extent to which performance on a criterion-referenced, written proficiency examination in clinical laboratory technology (CLT) correlates with measures of laboratory practice. The following assessment instruments were developed and used: (a) the Written Examination in CLT, (b) the Practical Examination in CLT, and (c) the Supervisor Rating Instrument in CLT. The pretest sample consisted of 49 entry-level, school-trained clinical laboratory technologists, and the test sample consisted of 203 job-trained laboratory personnel of whom 40% had received most of their clinical training on-the-job and 60% had received most of their clinical training in a school or training program.

HRP-0902078/5 PC **A02**/MF **A01**
Professional Examination Service, New York.
Correlation of Performance on Clinical Laboratory Proficiency Examinations with Performance in Clinical Laboratory Practice.
Executive summary 1 Oct 77-31 Jul 79,
Craig G. Schoon, Maureen Kaley, and Ina Stern. Jul 79, 9p
Contract PHS-HRA-231-77-0118
See also Final Report, HRP-0902077.

In accordance with the purpose of the research project, PES was responsible for developing the following assessment instruments: (a) the Written Examination in CLT, (b) the Practical Examination in CLT, and (c) the Supervisor Rating Instrument (SRI) in CLT. Each assessment instrument has four sections, one for each CLT area: blood banking, clinical chemistry, hematology, and microbiology. The Role Delineation Methodology devel-

oped by PES provided a framework for the development of these assessment instruments. This methodology is described in the report.

HRP-0902140/3 PC **A15**/MF **A01**
Mississippi Health Systems Agency, Inc., Jackson.
Health Systems Plan for 1979. Health Service Area 1 Mississippi. Second Edition.
1979, 345p
Grant PHS-04-P-000265-01-0
See also AIP 1979, HRP-0902141.

The Health Systems Plan (HSP) is an attempt by the MHSA to state the desired future which will improve the health status of Mississippi's residents and the health systems serving these residents. The purpose of the HSP is to promote, at the local level, comprehensive health systems which will improve levels of health status, assure a healthful environment, and provide for the availability and accessibility of high quality health services in a manner which assures continuity of care at a reasonable cost for all residents of the health service area (Mississippi). This edition of the Health Systems Plan describes Mississippi's health needs and sets forth long-range (5 year) goals, objectives, recommended actions, resource requirements, and goal priorities. The HSP covers a broad range of health services and settings with a focus on primary care. The reason for this is to give a broad overview of the health status and health system in Mississippi with the understanding that future HSP's will get more and more specific. The analysis of these services, and the goals and objectives derived, centers around the characteristics of availability, accessibility, cost, acceptability, continuity and quality.

HRP-0902141/1 PC **A03**/MF **A01**
Mississippi Health Systems Agency, Inc., Jackson.
Annual Implementation Plan for 1979. Health Service Area 1 Mississippi.
Rept. for 16 Aug 79-1 Aug 80.
24 May 79, 31p
Grant PHS-04-P-000265-01-0
See also HSP 1979, HRP-0902140.

The primary purpose of the Mississippi Health Systems Agency (MHSA) is to improve the health of Mississippi residents; increase the accessibility, acceptability, continuity and quality of health services provided to them; restrain increases in the cost of providing health services; and prevent unnecessary duplication of health resources. Fundamental to accomplishing the purpose is the development and use of a Health Systems Plan (HSP) and Annual Implementation Plan (AIP), both of which are required by federal law establishing the health planning process. The HSP is a long-range document (five years) which sets forth selected goals for the improvement of the health system encompassed by the health systems agency, as well as long-range objectives designed to measure progress in meeting the goals. The AIP is best viewed as a more detailed short-range (one year) expression of concrete actions, and expected results, which will be undertaken by the community and the MHSA during the period of August 16, 1979, to August 15, 1980, in order to meet the HSP's goals and objectives.

HRP-0902142/9 PC **A03**/MF **A01**
Mississippi Health Systems Agency, Inc., Jackson.
Health Systems Plan for 1979. Executive Summary.
1979, 33p
Grant PHS-04-P-000265-01-0
See also AIP 1979, HRP-0902141 and HSP 1979, HRP-0902140.

Contents:
Mississippi Health Systems Agency, Inc.;
Purpose and use of the plan;
Plan framework;
Planning process;
Primary health status goals and objectives;
Secondary health status goals and objectives;
Health system goals and objectives;
First order priority health systems, goals, objectives, recommended actions, and resource requirements.

HRP-0902145/2 PC **A99**/MF **A01**
Health Planning Association of Northwest Ohio, Maumee.
Health Systems Plan and Annual Implementation Plan for 1979. Health Service Area 4 Ohio. 2nd Edition.
1979, 683p
Grant PHS-05-P-000207-03-1

This is the second in a series of Health Systems Plans for Northwest Ohio developed by the Health Planning Association of Northwest Ohio, the health systems agency for Area IV Ohio. This plan attempts to present a coherent frame of reference within which the Health Planning Association can examine major health issues. Issues of concern include control of health care costs, development of new knowledge, prevention of disease, improvement of health care in the delivery system, and quality of care. The Health Systems Plan for Northwest Ohio is the culmination of a year-round effort including the solicitation of comments on draft plans from consumer and providers in Health Service Area IV. This plan follows the format outlined in the 'Ohio Planning Guidance for Health Systems Agencies and The State Health Planning and Development Agency' and in the U.S. Department of Health, Education, and Welfare 'Guidelines Concerning the Development of Health Systems Plans'. The new Health Systems Plan is more comprehensive and complete than the past plan and includes updated statistics whenever they are available.

INIS-mf-4328 MF **A01**
Hamburg Univ. (Germany, F.R.). Fachbereich Medizin.
RIA According to the Radioimmunosorbent Method for the Measurement of Human Plasma HCG and HLH.
Diss. (M.D.),
G. Stein. 10 Dec 73, 86p
In German.
U.S. Sales Only. Microfiche copies only.

The paper describes the experimental arrangement of an RIA according to the radioimmunosorbent technique for the measurement of plasma HLH and HCG. (Atomindex citation 09:391834)

INIS-mf-4338 PC **A04**/MF **A01**
Freiburg Univ. (Germany, F.R.). Medizinische Klinik.
Radioimmunological Determination of the Oral Antidiabetic Glibenclamide and Its Metabolites in the Serum.
Diss. (M.D.),
L. Nissen. 29 Nov 74, 52p
In German.
U.S. Sales Only.

The paper describes a sensitive, specific radioimmunological method for the determination of the oral antidiabetic glibenclamide in the serum. (Atomindex citation 09:391828)

INIS-mf-4347 PC **A04**/MF **A01**
Duesseldorf Univ. (Germany, F.R.). Medizinische Fakultaet.
Investigation Concerning the Determination of the Hepatitis B Surface Antigen (HBsAG) by RIA.
R. Stute. 1976, 51p
In German.Diss. (M.D.).
U.S. Sales Only.

The author searched for a method to shorten the time required for a RIA and to increase its sensitivity. This is possible by using herring plasma instead of serum, by increasing the reaction temperature, and by using a shaking water-bath. The detection limit could be lowered by three powers of ten by changing the environment. By shortening the RIA time, it is possible in blood donation to use the stored blood as early as 2-3 h after withdrawal without increasing the hepatitis risk. (Atomindex citation 09:395259)

JINR-16-11153 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Method of Isodose Fields Computer Calculations of Proton Irradiation in Radiotherapy.
V. M. Abazov, and V. P. Zorin. 1978, 8p
In Russian.
U.S. Sales Only.

The use of medical proton beams supposes the presence of data of dose field distribution in a tumour and normal tissues surrounding it. At multipole and rotational irradiation the labour-consuming character of the calculation with the earlier applied parallel transfer method using graphic technique has considerably increased resulting in the necessity of development of the program of computer dose field calculation. In conformity to the program consisting of four main parts, an example of dose pole calculation with the results on graphoplotter "Calcomp" is given. The calculation is performed for the case when the tumour is located in the left part of the lung. A comparative analysis of the accuracy of applied methods of tumour dose pole calculation is carried out. It is shown that in spite of the less accuracy the parallel transfer method ensures the calculation time reduction by 100 times. The results obtained in most cases allow in planning patient medical treatment to limit to the use of parallel transfer method when calculating dose fields in the tumour and normal tissues surrounding it. (Atomindex citation 10:480183)

N80-22963/6 PC **A04**
National Aeronautics and Space Administration, Washington, DC.
Aerospace Medicine and Biology: A Continuing Bibliography with Indexes, Supplement 205.
Apr 80, 68p NASA-SP-7011(205)

This bibliography lists 212 reports, articles, and other documents introduced into the NASA scientific and technical information system in March 1980.

N80-22972/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Automated System for Diagnosing Craniocerebral Injury.
N. I. Moiseyeva, G. D. Luchko, R. V. Kremleva, A. V. Morozov, and L. I. Nikitina. Mar 80, 10p
NASA-TM-76097
Contract NASW-3198
Transl. Into English from Sov. Med. (USSR), No. 10, Oct. 1979 p 94-98. Transl. By Scittran, Santa Barbara, Calif.

A Russian national computing and communication system designed to assist non-specialized physicians in the diagnosis and treatment of craniocerebral injury is described.

PB80-178569 PC **A02**/MF **A01**
North Carolina Univ. at Chapel Hill. Dept. of Epidemiology.
Quality of Ambulatory Care: An Exploration of the Discrepancy between Explicit Process Criteria and Performance.
Research summary series 30 Jun 75-30 Jun 78, Barbara S. Hulka. Apr 80, 25p NCHSR-80-23, DHEW/PUB/PHS-80-3244
Contract PHS-HRA-230-75-0186

This research addresses the issue of the generally low levels of compliance with quality of ambulatory care process criteria which have been demonstrated in a number of previous studies. Thirty-one physician members of the North Carolina Society of Internal Medicine participated in setting process criteria for management of hypertension, diabetes mellitus, dysuria and the general medical examination, and in providing a total of 869 patient records for abstraction and audit against the criteria. Scores representing levels of adherence to the criteria were calculated. In addition, ten physicians provided implicit judgments about the quality of care on a subset of 156 of these records. In implicit review, no reference is made to pre-established written criteria. Outcome criteria were developed for each of the four conditions of interest and relationships between process scores and outcomes were examined.

PB80-178916 PC **A17**/MF **A01**
Harvard Community Health Plan, Boston, MA.
A Computer-Based Ambulatory Quality Assurance Program.
Final rept. 1 May 76-31 Oct 79,
Richard N. Winickoff, G. Octo Barnett, Kathy L. Coltin, and Mary M. Morgan. Oct 79, 392p
NCHSR-80-37
Grants PHS-HS-02142, PHS-HS-00240
Prepared in cooperation with Massachusetts General Hospital, Boston. Lab. of Computer Science.

This project utilized an automated record system, COSTAR, in a prepaid group practice type HMO, to assess and improve quality of care. Eighteen clinical problems were selected, and ten went through the stages of standard setting, audit, intervention to correct deficiencies, and evaluation. In eight of the ten, significant improvement was documented. Concurrent reminders, provider education, computer-generated flags on records, and peer-comparison feedback were effective as quality assurance interventions in one or more projects. Organizational commitment, provider involvement, a good record system, prompt and personal feedback, simple criteria and emphasis on finding and solving problems are factors that contribute to a successful program. An automated record system greatly facilitates certain kinds of projects, but is not crucial to a successful quality assurance program. Most of the successful projects could be adapted to a traditional paper record system.

PB80-179989 PC **A07**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC. Ethics Advisory Board.
Transcript of Proceedings - Meeting of the Ethics Advisory Board, April 18, 1980. Volume I.
18 Apr 80, 147p
See also Volume 2, PB80-179997.

Contents:
- Center for Disease Control proposal;
- National Institutes of Health proposal;
- Center for Disease Control proposal.

PB80-179997 PC **A15**/MF **A01**
Department of Health, Education, and Welfare, Washington, DC. Ethics Advisory Board.
Transcript of Proceedings - Meeting of the Ethics Advisory Board, March 14, 15, 1980. Volume II.
14 Mar 80, 332p
See also Volume 1, PB80-179989.

Contents:
- Presentation of revised NIH proposal for a limited exemption from the Freedom of Information Act;
- Further explanation of NIH proposal;
- Examples and discussions of typical clinical trials;
- Discussion and conduct of clinical trials;
- Comments of the Institute for Public Representation.

PB80-180318 Not available NTIS
National Bureau of Standards, Washington, DC.
Accuracy Requires Precision: A Comment on Understanding and Using Statistics in Nuclear Medicine.
Final rept.,
R. Colle. Mar 80, 3p
Pub. in J. Nucl. Med. 21, n3 p90-92 Mar 80.

This letter to the Editor is in regards to a recent article by Levin (J. Nucl. Med 20: 550-558, 1979) who reviewed some of the fundamental principles of statistics as they apply to the estimation of measurement uncertainties. Levin unfortunately, has reinforced a common misunderstanding of the meaning of 'accuracy'. He uses the extremely restrictive definition of accuracy as equivalent to the absence of bias, and contends that accuracy is independent of precision. This letter clarifies the distinction between precision and bias, and their relation to accuracy. It points out that accuracy requires precision, and that an understanding of this furthers the understanding of the measurement process and the requirements for obtaining accurate measurements.

PB80-181944 PC **A12**/MF **A01**
Environmental Protection Agency, Washington, DC.
The Health Consequences of Sulfur Oxides: A Report from CHESS (Community Health and Environmental Surveillance System), 1970-1971, May, 1974. Appendum.
Apr 80, 263p EPA-600/1-80-021

A controversy about the scientific credibility of results from the Community Health and Environmental Surveillance System (CHESS) study prompted a series of Congressional hearings in 1976 ('The Brown Report') with subsequent legislation (Public Law 95-155) to enact the Environmental Research, Development and Demonstration Authorization Act of 1978. This addendum has been compiled to satisfy Recommendation 3(c) of The Brown Committee Report, entitled 'The Environmental Protection Agency's Research Program with Primary Emphasis on the Community Health and Environmental Surveillance System (CHESS): An Investigative Report.' It contains the following materials which concern the 1974 CHESS Monograph and various CHESS studies, in addition to EPA's research and development program in general: as follows The Brown Committee Report; P.L. 95-155; Appendices from EPA's Research Outlook for 1978 and 1979; and the Science Advisory Board's Health Effects Research Review Group Report to Congress in February 1979.

PB80-182215 PC **A03**/MF **A01**
National Center for Health Statistics, Washington, DC.
Migration, Vital, and Health Statistics, A Report of the United States National Committee on Vital and Health Statistics.
Nov 68, 28p PHS-PUB-1000-4-9
Pub. as Vital and Health Statistics Ser-4-9.

The report is an assessment of the needs for migration statistics; the procedures whereby statistics might be secured; the interrelations of vital processes and health with the movements of people; and the steps required to secure data and advance research.

PB80-183338 PC **A03**/MF **A01**
Bureau of Radiological Health, Rockville, MD.
Radiation Recommendations: Quality Assurance Programs for Diagnostic Radiology Facilities.
Final rept.,
Roger L. Burkhart. Feb 80, 47p DHEW/PUB/FDA-80-8110, FDA/BRH-80/57

The consistent production of radiographs of a desired image quality with minimum exposure to patients is a basic goal of the Bureau of Radiological Health. With respect to the use of radiation producing equipment such as diagnostic radiology units, the BRH believes recommendations are a more effective means than regulations in reducing unnecessary radiation exposure while retaining the flexibility necessary for the provision of effective medical care. The BRH's Division of Training and Medical Applications plans to issue a series of recommendations to encourage practices that the division believes will be valuable in reducing unnecessary radiation exposure in situations where regulations would not be effective or desirable. The first recommendation in the series encourages diagnostic radiology facilities to voluntarily establish quality assurance programs. Effective quality assurance programs can ensure that the equipment components of a facility's x-ray system will consistently produce diagnostic quality images with minimum patient exposure. In this publication, the development of the recommendation is reviewed, the evidence of the need for and benefit from quality assurance programs is described, and the recommendation is discussed. Other activities of the Bureau and private groups to aid facility quality assurance programs are also discussed and their relationship to the recommendation described.

PB80-184153 PC **A05**/MF **A01**
Healthwise, Inc., Boise, ID.
Common Sense - Common Health Evaluation: Final Report and Executive Summary.
Final rept. 30 Sep 76-31 Mar 79,
Donald W. Kemper. 31 Mar 79, 95p NCHSR-80-41
Grant PHS-HS-2109

Medical self-care programs attempt to improve health and reduce medical costs by enriching individual competence in managing common health problems. This research attempted to evaluate the effectiveness of a widely used self-care program through randomized controlled trials in several clinic settings. In the prepaid group practice setting, clinic and referral costs were 10% lower for experimentals than for controls. Resulting savings amounted to $100 per participating family over a 12 month period. Other findings included high program enrollments, significantly increased self-care knowledge, and an apparent lack of program impact on the frequency of in-clinic visits.

PB80-186992 PC**$14.00**/MF **A01**
Center for Disease Control, Atlanta, GA. Bureau of Labs.
Laboratory Diagnosis of Mycoplasma Infections (Course 8226-C),
Wallis M. Velleca, Billie Ruth Bird, and Francis T. Forrester. 1980, 149p HEW/CDC/BL-80/0003

This manual is designed for use with the Center for Disease Control Course No. 8226-C, Laboratory Diagnosis of Mycoplasma Infections and is a reference for performing Mycoplasma diagnostic tests. This manual contains laboratory protocols recommended for the isolation, identification and serodiagnosis of human Mycoplasmas. Emphasis is placed on procedures for laboratory diagnosis of Mycoplasma pneumonia, M. hominis and Ureaplasma urealyticum infections. Methods for Mycoplasma detection in cell culture are also included. Each set of laboratory protocols is preceded by a description of the test principle and is followed by an interpretation of the test results. The manual is useful to any laboratory engaged in or developing a program for Mycoplasma testing.

PB80-187008 PC**$12.00**/MF **A01**
Center for Disease Control, Atlanta, GA. Bureau of Labs.
Laboratory Methods for Diagnosing Herpesvirus Infections (Course 8229-C),
Harold C. Ballew, H. Craig Lyerla, and Francis T. Forrester. Dec 79, 188p HEW/CDC/BL-78-0014

This reference manual provides detailed instruction in both conventional and rapid laboratory methods used in the isolation and identification of herpes simplex viruses. The manual includes classification, structure, replication, characterization, clinical manifestations, isolation, and identification of herpes simplex viruses. Numerous photographs, illustrations, and current references are included to assist the reader in understanding the identification of herpes viruses.

PB80-187016 PC**$10.00**/MF **A01**
Center for Disease Control, Atlanta, GA. Bureau of Labs.
A Guide to the Performance of the Standardized Diagnostic Complement Fixation Method and Adaptation to Micro Test,
Dan F. Palmer, Helen L. Casey, and John R. Olsen. Dec 74, 71p HEW/CDC/BL-69-0001 Revision of report dated Jul 69.

This manual is a procedural guide to the exact performance of a standardized diagnostic complement fixation test. Because this guide is primarily for use by laboratorians who have had little experience in performing the complement fixation test, its instructions are given in unusual detail.

PB80-187024 PC**$10.00**/MF **A01**
Center for Disease Control, Atlanta, GA. Bureau of Labs.
Rubella Hemagglutination-Inhibition Tests.
Immunology series no. 2,
Dan F. Palmer, Joseph J. Cavallaro, and Kenneth L. Herrmann. Aug 77, 97p HEW/CDC/BL-77/0042

This is a procedural guide that contains the standardized rubella hemagglutination-inhibition test using chick cells and a modification of the standardized test using human O cells. In addition, it contains a very useful section on serum fractionation to separate IgG and IgM classes of antibodies with sucrose gradients.

PB80-187032 PC**$9.00**/MF **A01**
Center for Disease Control, Atlanta, GA. Bureau of Labs.
Laboratory Techniques for the Detection of Hepatitis B Surface Antigen.
Immunology series no. 9,
James E. Maynard, Martin S. Favero, Kenneth R. Berquist, Howard A. Fields, and Bert L. Murphy. Jul 77, 108p HEW/CDC/BL-77/0043, DHEW/PUB/CDC-78-8353

This is a comprehensive manual that describes a variety of laboratory techniques for the serodiag-

nosis of hepatitis B, including reverse passive hemagglutination, radioimmunoassay, and immunoelectrophoresis. It also contains a section on sub-typing of the heaptitis B surface antigen.

PB80-187040 PC**$9.00**/MF **A01**
Center for Disease Control, Atlanta, GA. Bureau of Labs.
Radial Immunodiffusion Test and the Immunoelectrophoresis Test for Qualitation and Quantitation of Immunoglobulins.
Immunology series no. 3,
Dan F. Palmer, and Roy Woods. Jan 72, 100p HEW/CDC/BL-72/0001

This is a procedural guide for use by those laboratorians who wish to set up serologic procedures to quantitate and qualitate immunoglobulins without recourse to commercial kits. The manual contains, in addition to descriptions of the radial immunodiffusion test and the immunoelectrophoresis test, a section on interpretation of immunoelectrophoresis patterns obtained with serum from myeloma patients.

PB80-187057 PC**$9.00**/MF **A01**
Center for Disease Control, Atlanta, GA. Bureau of Labs.
Advanced Laboratory Techniques for Influenza Diagnosis.
Immunology series no. 6,
Dan F. Palmer, Marion T. Coleman, Walter R. Dowdle, and Geoffrey C. Schild. Jan 75, 125p HEW/CDC/BL-75/0003

The report is a procedural guide containing, in addition to routine isolation techniques and the hemagglutination-inhibition test, a number of other tests used in serologic studies of influenza including double immunodiffusion, single radial immunodiffusion, and the neuraminidase inhibition test.

PB80-187065 PC**$9.00**/MF **A01**
Center for Disease Control, Atlanta, GA. Bureau of Labs.
Immunofluorescence Detection of Autoimmune Diseases.
Immunology series no. 7,
Joseph J. Cavallaro, Dan F. Palmer, and Pierluigi E. Bigazzi. Jan 76, 133p HEW/CDC/BL-76/0009

This is a procedural guide that describes a variety of indirect immunofluorescence tests used in the detection of antinuclear antibodies, gastric parietal cell antibodies, mitochondrial antibodies, smooth muscle antibodies, and thyroid antibodies. It includes a section on the tanned red cell hemagglutination test for thyroglobulin antibodies.

PB80-187073 PC**$9.00**/MF **A01**
Center for Disease Control, Atlanta, GA. Bureau of Labs.
Serology of Toxoplasmosis.
Immunology series no. 1,
Dan F. Palmer, Joseph J. Cavallaro, Kenneth Walls, Alexander Sulzer, and Marianna Wilson. Jan 76, 55p HEW/CDC/BL-76/0010

This is a procedural guide for performing the two most useful tests used in the serodiagnosis of toxoplasmosis; the indirect immunofluorescence test and the passive hemagglutination test. It is in sufficient detail for laboratorians to use with little previous experience in these techniques.

PB80-187644 PC **A14**/MF **A01**
Ohio State Univ. Research Foundation, Columbus.
Economic Responses to Poor Health in Older Males: Final Report and Executive Summary.
Final rept. 15 Sep 77-31 Dec 79,
Donald O. Parsons, Belton M. Fleisher, and Howard P. Marvel. Mar 80, 318p NCHSR-80-45 Grant PHS-HS-02818

The purpose of this research is to examine the impact of poor health of older males on a wide variety of labor market activities, particularly with the differential response of men to poor health as a function of their family situation. It is noted that unmarried men in poor health work substantially less than married men. Occupation also affects the response. The household model is developed at both the theoretical and empirical level. Particular attention is given to adjustment cost factors such as work hour adjustment costs and market entry costs for females and asset adjustment costs for different types of assets. The principal data base for the empirical analysis is the National Longitudinal Surveys of older males, 45 to 59 in 1966, the initial survey year. The empirical models are estimated using ordinary least squares and two and three stage least squares simultaneous techniques and, when appropriate, nonlinear methods.

PB80-810922 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Ultrasonics in Medicine. 1964-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-May 80,
Elizabeth A. Harrison. Jun 80, 157p
Supersedes NTIS/PS-79/0563 and NTIS/PS-78/0494. For the companion Published Searches of the Engineering Index Data Base, see NTIS/PS-76/0345, NTIS/PS-79/0564, and PB80-810930.

The bibliography presents citations from Federally-funded research on the use of ultrasound in diagnosis and therapy. Information is presented on ultrasonic imaging techniques, echoencephalography, echocardiography, use of ultrasound in bone surgery, and ultrasonic instrumentation. (This updated bibliography contains 150 abstracts, 25 of which are new entries to the previous edition.)

PB80-810930 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Ultrasonics in Medicine. April, 1978-May, 1980 (Citations from the Engineering Index Data Base).
Rept. for Apr 78-May 80,
Elizabeth A. Harrison. Jun 80, 257p
Supersedes NTIS/PS-79/0565 and NTIS/PS-78/0495. For the companion Published Search of the NTIS Data Base, see PB80-810922. See also 1970-1974, NTIS/PS-76/0345 and February, 1975-April, 1978, NTIS/PS-79/0564.

Research reports on the applications of ultrasound to diagnosis and therapy are cited from worldwide literature. Information is presented on ultrasonic imaging techniques, ultrasonic echoencephalography, echocardiography, use of ultrasound in surgery, and ultrasonic instrumentation in biomedical measurement. (This updated bibliography contains 250 abstracts, 137 of which are new entries to the previous edition.)

PB80-810971 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Health Care Malpractice Legislation and Medical Malpractice Legislation. August, 1973-May, 1980 (Citations from the NTIS Data Base).
Rept. for Aug 73-May 80,
Elizabeth A. Harrison. Jun 80, 118p
Supersedes NTIS/PS-79/0617 and NTIS/PS-78/0472.

The selected abstracts of research reports cover health legislation that relates to medical malpractice or health care malpractice. Specific subjects covered include: Insurance, economics, arbitration, statutory immunity, state and Federal Government, health manpower statistics, quality assurance and medical equipment. (This updated bibliography contains 111 abstracts, 12 of which are new entries to the previous edition.)

PB80-811003 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Radiodiagnostic Agents and Techniques. 1977-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1977-May 80,
Elizabeth A. Harrison. Jun 80, 268p
Supersedes NTIS/PS-79/0590 and NTIS/PS-78/0457. See also 1964-1973, NTIS/PS-76/0291 and 1974-1976, NTIS/PS-78/0456.

Research reports are cited on the applications of neutrons, protons, x-rays, and radioisotopes to medical diagnosis. The topics cover research on biomedical radiography, scanning and imaging techniques including tomography, production of radiopharmaceuticals, dosimetry and health physics, equipment, and computer applications. (This updated bibliography contains 264 abstracts, 49 of which are new entries to the previous edition.)

PB80-811078 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Health Planning Legislation. January, 1979-May, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 79-May 80,
Elizabeth A. Harrison. Jun 80, 235p
Supersedes NTIS/PS-79/0560 and NTIS/PS-78/0476.

Health care costs, health systems agencies, mental health care, and health care delivery organizations are specific topics covered by the selected abstracts of research reports on health planning legislation. Other subjects are health care facilities, health manpower, health care utilization, health resources, state and Federal Government, and health education. (This updated bibliography contains 226 abstracts, 5 of which are new entries to the previous edition.)

PB80-922905 PC**$8.00**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Genetic Predisposition to Cancer in Man.
Oncology overview.
13 May 80, 151p NCI/ICRDB/OK-80/05

Oncology Overviews are a service of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute, intended to facilitate and promote the exchange of information between cancer scientists by keeping them aware of literature related to their research being published by other laboratories throughout the world. Each Oncology Overview represents a survey of the literature associated with a selected area of cancer research. It contains abstracts of articles which have been selected and organized by researchers associated with the field. Contents: Dominantly inherited cancers and predisposing syndromes; Other genetic states associated with cancer; General reviews.

PB80-929407 PC**$5.25**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Preclinical Radiologic Diagnosis and Radiotherapy of Cancer.
Special listing.
23 May 80, 66p NCI/ICRDB/SL-354
Supersedes NTISUB/E/294-017.

The Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. Approximately 50 different cancer research areas are covered by a separate Special Listing. The research areas include: Diagnosis of cancer by x-radiography; Use of radioisotopes in the diagnosis of cancer: isotope preparation, scanning equipment, and methodology; New methods with potential for the radiologic diagnosis of cancer; X-ray, radioisotope, heavy particle, hyperthermia, and other radiation therapy of cancer; Combinations of radiotherapy with chemotherapy, hormone therapy, or immunotherapy; Radiation dosimetry and dose fractionated irradiation studies; Effect of radiotherapy on cell culture and on host immunity; New techniques and equipment for cancer radiotherapy; Special radiotherapy agents and procedures; Radiation pathology, injury, toxicity, and other side effects; Broad studies on radiologic diagnosis and/or radiotherapy of cancer.

PB80-929408 PC**$6.50**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Bone and Cartilage Tumors and Soft-Tissue Sarcomas.
Special listing.
3 Jun 80, 101p NCI/ICRDB/SL-332
Supersedes NTISUB/E/294-013.

The Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each Listing con-

tains descriptions of ongoing projects in one selected cancer research area. The research areas: Chemical, radiation, viral, and other carcinogenic and etiological studies of bone and cartilage tumors and soft-tissue sarcomas; Preclinical and clinical diagnosis and prognosis of bone and cartilage tumors and soft-tissue sarcomas; Prevention and preclinical therapy of bone and cartilage tumors and soft-tissue sarcomas in model systems, and other preclinical studies; Clinical therapy of bone and cartilage tumors and other sarcomas; Broad clinical programs and cooperative group studies; Tumor registries and epidemiological studies of bone and cartilage tumors and soft-tissue sarcomas.

PB80-929409 PC$6.00/MF$3.00
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Clinical Radiologic Diagnosis and Radiotherapy of Cancer.
Special listing.
5 Jun 80, 85p NCI/ICRDB/SL-335
Supersedes NTISUB/E/294-016.

The Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. Approximately 50 different cancer research areas are covered by a separate Special Listing. The research areas include: Ultrasonography and thermography in the detection of cancer; Diagnosis of cancer by x-radiography; Use of radioisotopes in the diagnosis of cancer: Isotope preparation, scanning equipment, and methodology; Radioisotope scintigraphy of cancer in specific body sites; New methods with potential for the radiologic diagnosis of cancer; Training and other education programs in diagnostic radiology; X-ray, radioisotope, heavy particle, hyperthermia, and other radiation therapy of cancer; Combinations of radiotherapy with chemotherapy, hormone therapy, or immunotherapy; Radiation dosimetry and dose fractionation studies; Radiotherapy of specific organs including pathological and host effects; New techniques and equipment for cancer radiotherapy; Computer-assisted treatment planning of cancer radiotherapy; Radiosensitizing agents and procedures in cancer radiotherapy; Broad cancer radiotherapy programs, including education and services.

6F. Environmental Biology

IDO-12088 PC **A04**/MF **A01**
Department of Energy, Idaho Falls, ID. Idaho Operations Office.
Proceedings of the Symposium on the Idaho National Engineering Laboratory Ecology Programs.
O. D. Markham, and W. J. Arthur. Apr 79, 75p CONF-7809155-
Symposium on the Idaho National Engineering Laboratory ecology programs, Grand Teton, WY, USA, 10 Sep 1978.

The symposium covered all aspects of ecological research being conducted at the Idaho National Engineering Laboratory Site in southeastern Idaho. Entries wer made for the individual papers. (ERA citation 05:016588)

ISM-260 PC **A02**/MF **A01**
Ames Lab., IA.
Trace Element Levels and Their Enrichment Processes in Terrestrial Vegetation.
J. J. O'Toole, T. E. Wessels, and K. L. Malaby. 1979, 14p CONF-791145-1
Contract W-7405-ENG-82
International symposium on trace elements stress in plants, Los Angeles, CA, USA, 6 Nov 1979.

Sampling sites were installed in the native plant communities northwest and southeast of Colstrip, Montana. Spring and fall foliage was sampled from three perennial grasses and two deciduous shrubs. Analysis for over thirty elements is reported and their relationships to site, species, and season is statistically evaluated. Elemental enrichments of vegetation due to physiological processes, soil, and power plant plume aerosols are assessed. These processes and the sensitivity for detecting certain contaminating elements are discussed in the light of the data reported and its statistical treatment. (ERA citation 05:018081)

ORNL/EIS-157 PC **A08**/MF **A01**
Oak Ridge National Lab., TN.
Thermal Effects on Aquatic Organisms: An Annotated Bibliography of the 1978 Literature.
S. S. Talmage. Jan 80, 160p
Contract W-7405-ENG-26

This bibliography, containing 457 references from the 1978 literature, is the eighth in a series of annotated bibliographies on the effects of heat on aquatic organisms. The effects of thermal discharges at power plant sites are emphasized. Laboratory and field studies on temperature tolerance and the effects of temperature changes on reproduction, development, growth, distribution, physiology, and sensitivity to other stresses are included. References in the bibliography are divided into three subject categories: marine sytems, freshwater systems, and estuaries. The references are arranged alphabetically by first author. Indexes are provided for author, keywords, subject category, geographic location of the study, taxon, and title (alphabetical listing of keywords-in-context of nontrivial words in the title). (ERA citation 05:018073)

PATENT-4 187 290 Not available NTIS
Department of the Navy Washington DC
Carrier and Dispersal Mechanism for a Microorganic Larvicide.
Patent,
Leonard J. Goldberg. Filed 18 Apr 79, patented 5 Feb 80, 5p AD-D007 197/7, PAT-APPL-6-030 961
Supersedes PAT-APPL-6-030 961, AD-D006 054.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This document discloses a method of controlling mosquito larvae, by using a spore-forming bacillus ONR-60A obtained from screening clonal isolates from soil samples of known mosquito larval breeding sites. A larvicide comprising the bacillus and a carrier is formulated as a buoyant colloidal suspension which stabilizes just under the surface of the water to concentrate in the feeding zone of many varieties of mosquito larvae. (Author)

PB80-144892 PC **A99**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Pesticide Programs.
Pesticide Data Submitters File.
Rept. for Jan 70-Dec 79.
Apr 80, 891p
Supersedes PB-287 791.

List of pesticide data submitters who wish compensation under 3C1D of the Federal Insecticide, Fungicide and Rodenticide Act. A cumulation from January, 1970 to December, 1979, the document is in two parts. The first is an alphabetical listing by chemical name which refers to the chemical code number, the second part is in chemical code order numerically and provides the data.

PB80-177819 PC **A02**/MF **A01**
Environmental Research Lab., Athens, GA.
Mathematical Modeling of Pesticides in the Environment: Current and Future Developments.
Journal article,
James V. Hill, IV. 1979, 12p EPA-600/J-79-062
Pub. in Journal of Environmental Systems 9(2) p99-107 1979.

Transport models, total ecosystem models with aggregated linear approximations, evaluative models, hierarchical models, and influence analysis methods are mathematical techniques that are particularly applicable to the problems encountered when characterizing pesticide chemicals in the environment. Because complete chemical, physical, and biological characterization is not available for most pesticides, research needs to be directed toward developing models for use in estimating whole system behavior based upon data representing a limited set of components and interactions.

PB80-178973 PC **A03**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
Evaluation of Community Services Administration (CSA) Emergency Energy Conservation Services Program; Subsidiary Topics: Health, Accessibility, Employment, Housing, Mobility.
Oct 78, 36p CSA-LN-2406
Contract CSA-B7B-5547
See also PB80-121197.

This report reviews and analyzes the impact of Community Services Administration's (CSA's) Emergency Energy Conservation Services Program in health improvement resulting from weatherization, in access to fuel supplies for the poor, in employment resulting directly or indirectly from energy program expenditures, in housing stability or the ability of clients to remain in their current residences, and in mobility and access to transportation.

PB80-179005 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Interlaboratory Evaluation of Microcosm Research. Proceedings of the Workshop Held at Athens, Georgia on September 18-19, 1979.
Final rept.,
Rizwanul Haque, J. Vincent Nabholz, and Michael G. Ryon. Apr 80, 31p ORNL/EIS-160, EPA-600/9-80-019

This workshop, held at Athens, Georgia, on 18-19 September 1979, was to aid the Office of Environmental Processes and Effects Research (OEPER) in evaluating and integrating microcosm research in the OEPER environmental research laboratories. Participants discussed the design, advantages, and limitations of microcosms; the value and potential role of microcosms in the regulatory decision-making process; the identification of priority and long-term research needs to refine microcosm methodology as a data source for hazard and risk assessments; and the creation of a microcosm technology committee to assist OEPER in coordinating and integrating microcosm research.

PB80-179252 PC **A05**/MF **A01**
Geomet, Inc., Gaithersburg, MD.
The Chesapeake Bay Program. Project Summaries.
Final rept. 21 Jun-28 Sep 79,
Harry W. Wells, William C. Allen, and Harry E. Reactor. Oct 79, 86p GEOMET-ES-790, EPA-600/8-79-030
Contract EPA-68-01-4144

'The Chesapeake Bay Program, Project Summaries,' is a compilation of 44 1-page reports assembled to give the reader administrative data including performing organization, principal investigator, project officer, project period, project number and funding and summaries discussing the objectives, scientific approach, and products for each projects. The report is divided into seven separate areas: (1) Toxics, (2) SAV, (3) Eutrophication, (4) Environmental Management, (5) State Participation, (6) Public Participation, and (7) Data Management. Each area includes a brief introduction explaining the importance of the study in relation to the Chesapeake Bay Program.

PB80-180581 PC **E11**/MF **E11**
Atomic Industrial Forum, Inc., Washington, DC.
An Annotated Bibliography: Comparative Health Effects of Alternative Energy Sources.
Fred E. Yost, E. David Harward, and Sandra L. Nakamura. Feb 80, 97p INFORUM-011

This annotated bibliography contains information pertaining to the health effects associated with various alternative energy sources. Data were compiled to aid applicants and their consultants in meeting National Environmental Policy Act and 1977 Clean Air Act Amendment requirements regarding assessment of health effects of energy alternatives. Items selected for inclusion in the bibliography were limited to those having a direct bearing on comparative health effects and risk assessment. References are included in five major sections: general articles, risk assessment methodology, electric power generation, fuel extraction and fabrication and waste management and disposal. Personal and corporate author indexes are included.

PB80-181167 PC **A03**/MF **A01**
Nebraska Water Resources Center, Lincoln.

Application of Enzyme Methods to the Determination of Pollutants in Water.
Project completion rept. Jul 75-Sep 79,
K. M. Shahani. Mar 80, 30p W80-04868, OWRT-A-040-NEB(3)
Contract DI-14-34-0001-5027

Composite sewage samples were collected from a local dairy's effluent stream and analyzed for proximate composition, pH and BOD. Of the total BOD, lactose contributed 60%, protein 25% and lipid 15%. Enzymatic hydrolysis of these components increased the initial rate of utilization by the sewage microflora, but had no significant effect on the five-day BOD. The enzymes lactase, papain and lipase were immobilized either singly or together on a derivitized Sepharose solid support and used for the hydrolysis of lactose, protein and lipid in whey. Immobilization increased the stability of the enzymes without significantly altering their activity, pH optimum, temperature optimum or kinetic parameters. This multi-enzyme immobilized system offers promise for preparation of a hydrolyzed whey product. Proteins were recovered by precipitation with salt or heat or by ultrafiltration and the resultant permeate subjected to further reclamation. An immobilized lactase system was used for the continuous hydrolysis of the lactose in the permeate. The hydrolyzed product was quite sweet and could be used as a food grade syrup. The lactose in the whey permeate was converted to alcohol by the yeast Kluyveromyces fragilis. The permeate was used alone or in combination with grain to produce industrial alcohol for use in gasohol. Substitution of the whey for part of the grain mash water added additional fermentable carbohydrate and allowed a 15% reduction in grain with no decrease in alcohol production.

PB80-181894 PC **A07**/MF **A01**
System Sciences, Inc., Chapel Hill, NC.
Pilot Study - Uses of Medicare Morbidity Data in Health Effects Research,
Irwin J. Shiffer, and Edgar A. Parsons. Mar 80, 127p EPA-600/1-80-018
Contract EPA-68-02-2782

This project is a pilot investigation of the practicability of utilizing Social Security Administration (SSA) Medicare morbidity data to supplement mortality data in cancer and other environmentally-related studies. For this study non-confidential data on 1.2 million hospitalizations for 815,000 persons diagnosed as having a neoplasm, respiratory, or digestive disease during 1971, 1972, and 1973 were included. The data are kept current by SSA for their analysis purposes. The Medicare files are the only known source that incorporates all cancer cases systematically, regardless of whether the cancer is fatal. The Files facilitate analysis of possible relationships between emissions of a specific industry and the disease(s) rates for the co-located population. Numerous recommendations are made for applying the Medicare files to additional analyses of environment-to-health relationships. Prominent among these are cancer hospitalization trends, by county, augmented with cancer mortality trends, and available emmissions/monitoring measures to identify areas of cancer increase/decrease possibly related to environmental influences.

PB80-181977 PC **A03**/MF **A01**
Environmental Research Lab., Athens, GA.
Microcosms as Ecosystems for Testing Ecological Models.
Journal article,
Ray R. Lassiter. 1978, 37p EPA-600/J-78-166
Pub. in State-of-the-Art in Ecological Modeliing, v7 p127-161 1978.

Several microcosm types are currently in use, most to study the fate and effects of toxic substances. An example of the use of microcosms for testing and further development of a model for methoxychlor is described. The finding of an additional dominant process previously unconsidered for methoxychlor is discussed. Three simple ecosystems are considered and compared for their steady state values.

PB80-185242 PC **A02**/MF **A01**
Environmental Research Lab., Gulf Breeze, FL.
The American Oyster ('Crassostrea virginica') as an Indicator of Carcinogens in the Aquatic Environment,
John A. Couch, Lee A. Courtney, James T. Winstead, and Steven S. Foss. 1979, 22p EPA-600/J-79-080
Pub. in Animals as Monitors of Environmental Pollutants, p65-48 National Academy of Sciences 1979.

The American oyster (C. virginica) was used as the experimental animal for chronic exposure to 3-methylcholanthrene (3-MC) and benzo(a)pyrene (BP) in an exposure system in which the carcinogens can be continuously injected into free flowing water at fixed rates ranging from 1 to 5 micrograms/l. Experiments designed to determine uptake and distribution of 14C-MC and 14C-BP showed that these are concentrated in oyster tissues in direct proportion to the dosage of carcinogen injected into the system. Residual concentrations as high as 84.4 micrograms/kg of BP were present in oysters as long as 6 months following exposure. Autoradiography showed intense localization of 14C-BP in distal portions of the tubules of the digestive gland and to a lesser extent in the gonadal tissues.

PB80-185259 PC **A03**/MF **A01**
Environmental Research Lab., Gulf Breeze, FL.
Shrimps (Arthropoda: Crustacea: Penaeidae).
Final rept.,
John A. Couch. 1979, 26p EPA-600/J-79-083
Pub. in Pollution Ecology of Estuarine Invertebrates, ch7 p235-258 1979.

The pollution ecology of penaeid shrimps involving industrial organic chemicals, pesticides, petroleum, heavy metals, biological agents, and interactions of the above is discussed. Penaeid shrimps, within their geographic distribution, can serve as valid indicators of the presence and effects of many pollutant agents.

PB80-810799 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sewage Effects in Marine and Estuarine Environments. 1977-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1977-May 80,
Robena J. Brown. Jun 80, 104p
Supersedes NTIS/PS-79/0604 and NTIS/PS-78/0559. See also 1964-1976, NTIS/PS-78/0558.

Topics cover the effects that sewage effluents and sludge have upon marine and estuarine environments, especially their ecology. The effects on marine plants and animals, problems due to ocean dumping, dispersion studies, water chemistry, and other related topics are included. (This updated bibliography contains 97 abstracts, 17 of which are new entries to the previous edition.)

UCLA-12-1223 PC **A05**/MF **A01**
California Univ., Los Angeles. Lab. of Nuclear Medicine and Radiation Biology.
Ecological Baseline Studies at the Site of the Barstow 10 MWe Pilot Solar Thermal Power System.
F. B. Turner. Nov 79, 98p
Contract AM03-76SF00012

Baseline ecological measurements and observations were made in 1978 and 1979 at the site of the Barstow pilot 10 MWe solar thermal power system. The station will be constructed on Southern California Edison's Coolwater property. The climate of the area is typical of the Mojave Desert, with high summer temperatures (monthly means of up to 31 exp 0 C), and low rainfall (annual mean of 94 mm). About 66% of the rain falls in winter and spring. About 75% of winds are from the west-southwest to northwest, and mean monthly wind velocities during spring and summer are around 15 to 20 km hr exp -1 . Surface soils of the site are sandy, but soils below 3 m are generally well graded sand with some silt and gravel. Some of the soils are highly saline, to an extent precluding plant growth. All soils are alkaline, with pH values as high as 9. Over 130 species of plants have been identified on the site, 18 of which are non-native. Estimated aggregate densities of annual plants range from around 600 to almost 9000 m exp -2 , depending on sampling locale. Aggregate densities of perennials (including herbaceous species) range from as low as 0.2 to 4.4 m exp -2 . Creosotebush supports a varied assemblage of sap-feeding and defoliating insects, principally homopterans and orthopterans. Other shrubs are populated with hemipterans, mealybugs, thrips, phytophagous beetles and moth larvae. Common ground-dwelling species are ants, tenebrionid beetles, weevils, various orthopterans, and predatory arachnids. Some 300 different kinds of arthropods were distinguished in samples from the site. The most commonly trapped rodents were kangaroo rats (Dipodomys merriami, D. deserti), pocket mice (Perognathus formosus) and ground squirrels (Spermophilus tereticaudus). Over 60 kinds of birds were observed around the site, many associated with evaporating ponds adjoining the Coolwater Generating Station. (ERA citation 05:015297)

UCLA-12/1224 PC **A04**/MF **A01**
California Univ., Los Angeles. Lab. of Nuclear Medicine and Radiation Biology.
Revegetation Studies Pertinent to the Barstow 10 MWe Pilot Solar Thermal Power System and to Potential Power Plant Sites Elsewhere in the Mojave Desert.
E. M. Romney, A. Wallace, and R. B. Hunter. Nov 79, 51p
Contract EY-76-C-03-0012

The objectives of this study are to understand the abiotic and biotic processes influencing revegetation, and to experiment with techniques capable of enhancing the reestablishment and growth of native plants at that site. Findings are presented from three different aspects of experimental efforts. A ready-made restoration experiment already exists in the area on which the STPS is to be located as the result of the land being cleared for agricultural use in 1953, and then being abandoned in 1956. Those factors involved in the natural revegetation which have occurred during the 23 year period since that earlier disturbance are investigated. A field trial experiment using transplanted shrubs was established near the proposed mirror field site in order to investigate the extent to which the transplanted shrubs might be destroyed by grazing rabbits, and how they would respond to irrigation. Initial results indicate that shrubs can be transplanted successfully on site, if supplemental irrigation and protection from grazing rabbits is provided. Work is underway at the UCLA plant propagation facilities to prepare specimens of desert shrubs for future transplanting experiments. Experimental facilities and some recently cleared and abandoned land made available at the Nevada Test Site has allowed work to proceed on a newly disturbed site without being encumbered with construction activities and delays. (ERA citation 05:015125)

6H. Food

AD-A083 630/4 PC **A14**/MF **A01**
Army Natick Research and Development Command MA
A New Foodservice System Concept for Aircraft Carriers.
Technical rept.,
Richard P. Richardson, D. Paul Leitch, Brian M. Hill, Paul M. Short, and George Turk. Dec 79, 312p Rept no. NATICK/TR-80/007

Systems analysis has been applied to quantitatively identify all aspects of the conventional foodservice system onboard the aircraft carrier USS Saratoga (CV-60). Areas identified for potential improvement as a result of pre-test analysis included greater user acceptance, reduced waiting lines, increased operating efficiency, improved manpower utilization, and enhanced dining environment. Included are discussions of alternate system concepts that address improvements in the above areas. A deterministic analysis of the proposed fast food concept for the Saratoga is presented. The new concept focuses primarily on modifications to the ship's forward enlisted galley. A new high preference menu has been developed specifically around fast foods. A number of commercially equivalent, shelf stable, labor saving, ration dense food items have been selected in support of the menu. Various fast food products were vitamin fortified supplying consumers with a complete nutritional spectrum. Foodservice equipment selected

for the new concept reflects the latest technology. Post-test analysis of the system identified relative improvements in all areas including a 47% increase in food quality, a 52% increase in food variety, a 62% increase in customer appraisal of the dining environment, a 43% increase in worker productivity, a 100% increase in attendance at dinner and supper meals, and a 21% reduction in waiting lines.

AD-A083 909/2 PC **A06**/MF **A01**
General Accounting Office Washington DC Community and Economic Development Div
What Foods Should Americans Eat. Better Information Needed on Nutritional Quality of Foods.
30 Apr 80, 101p Rept no. GAO/CED-80-68
Report to the Congress.

Americans have a growing desire to select foods that promote good health. The Government needs to adopt a set of nutrition principles and provide authoritative guidance on safe levels of intake for controversial dietary substances that have been associated with certain diseases. Changes in lifestyles, which make calorie consumption a concern, and changes in the food supply intensify the need for up-to-date and complete data on foods' nutrient composition. Attempts have been made to classify foods as 'nutritious', 'low nutritious', or 'junk' foods. However, no food in isolation from a total diet should be characterized as good or bad. It is the combination of foods which complement each other that forms the basis for a nutritious diet. A greater Federal effort is needed to help consumers determine what foods and diet are best for their health, and to help Government carry out its food programs consistently and effectively.

PAT-APPL-6-132 582 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Protein Concentrate from High-Protein Pearl Millet.
Patent Application,
August V. Bailey, and Gene Sumrell. Filed 31 Mar 80, 10p PB80-188766
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Procedures are described for obtaining about 80% of the high-grade protein in pearl millet grain as a concentrate. These procedures involve extraction of lipid-free whole millet flour with a combination of 70% aqueous isopropyl alcohol, aqueous sodium hydroxide, and dilute mineral acid to give three protein-rich fractions, which can be combined for optimum use as a protein concentrate.

PB80-186638 PC **A02**
Oregon State Univ., Newport. Marine Science Center.
Refrigerated Seawater Spray System Model for Shrimp Vessels,
Edward Kolbe. c1979, 8p ORESU-R-79-016, NOAA-80043007
Grant NOAA-04-6-158-44004
Pub. in Jnl. of Food Science, v44 n5 p1420-1424 1979.

A mathematical simulation of refrigerated seawater spray cooling of shrimp onboard a vessel is described. The simulation describes compressor and chiller performance and heat transfer between shrimp and recirculating spray water. It also accounts for conduction through the hull and for pump energy. A series of temperature measurements onboard vessels verified the model which can be used to evaluate the sensitivity of cooling rates to changes in equipment or operating procedures. (Copyright (c) 1979, Institute of Food Technologists.)

PB80-189368 PC **A02**/MF **A01**
Maine Univ. at Orono. Dept. of Agricultural Engineering.
The Mechanization of Cultivated European Oyster Processing,
J. G. Riley, and D. A. Smyth. Jun 79, 23p MSG-TR-53, NOAA-80042803, ASAE/TP-78-5037
Presented at Joint Meeting American Society of Agricultural Engineers and Canadian Society of Agricultural Engineers held at Winnipeg, Canada on June 24-27, 1979.

Mechanization of handling and processing in Maine's cultivated European oyster industry is discussed. The design and development of prototype cleaning and grading equipment is described, together with results from field testing of these machines in commercial operations.

PB80-189392 PC **A02**
National Marine Fisheries Service, Charleston, SC. Charleston Lab.
Influence of Cadmium Ingestion on Bone Mineralization in the Rat,
Herta R. Legally, Thomas C. Siewicki, and Garfield N. Biddle. Mar 80, 11p NOAA-80042304
Pub. in Nutrition Reports General, v21 n3 p365-374 Mar 80.

Calico scallop (Aequipecten gibbus), bay scallop (A. irradians concentricus) or casein based diets containing 4.3 ppm cadmium either biologically bound in the scallops or as cadmium sulfate were fed to male, weanling rats during a 12-week experiment. At 0, 4, 6, 8 and 12 weeks, animals from each treatment were sacrificed and tissues analyzed for: cadmium, zinc, and arsenic (in kidneys); total ash, calcium, phosphorus, cadmium and zinc (in femurs); and serum glutamic oxalacetic transaminase, glutamic pyruvic transaminase, acid phosphatase and alkaline phosphatase activities. Kidney cadmium concentrations were higher in rats receiving the cadmium sulfate spiked casein diet than in rats receiving either the biologically bound cadmium calico scallop diet or the cadmium spiked bay scallop diet. Arsenic concentrations in the kidneys were higher when dietary arsenic was consumed as arsenic trioxide as compared to diets containing a majority of the arsenic as that naturally present in the scallops. Zinc levels in the femur were lowest in rats receiving cadmium regardless of cadmium source (scallop tissue bound versus ionic) or protein source (scallop versus casein). Therefore, it is concluded that femur zinc concentrations is an effective indicator of chronic low level cadmium exposure and that dietary factors (e.g., protein source) may alter an animal's metabolism of ingested cadmium.

PB80-189400 PC **A02**
National Marine Fisheries Service, Charleston, SC. Charleston Lab.
Cadmium Retention in Rats Fed Either Bound Cadmium in Scallops or Cadmium Sulfate,
Herta R. Legally, Garfield N. Biddle, and Thomas C. Siewicki. Mar 80, 14p NOAA-80042303
Pub. in Nutrition Reports International, v21 n3 p351-363 Mar 80.

Feeding studies were conducted to compare the effects of dietary sources of cadmium and protein on the excretion and retention of cadmium in the weanling rat. In the first study, whether ingested as bound cadmium in calico scallops (Aequipecten gibbus) or as cadmium sulfate in casein based diets, cadmium excretion patterns were similar. After 4 weeks of feeding, cadmium retention was lower in the kidneys or rats receiving the scallop diet. During a subsequent 4-week depletion period, an apparent shift in tissue cadmium occurred from the kidneys to the test of experimental animals. In a second experiment, when equal levels of cadmium (cadmium sulfate) were added to cooked or uncooked low cadmium bay scallop (Aequipecten irradians concentricus), or casein based diets, cadmium retention was lower among the scallop fed animals, thus demonstrating the influence of the dietary protein source on cadmium deposition in the rat. No definite cadmium induced effects on weight gains, hematocrits, zinc retention or arsenic retention were observed in either study. Cooking the scallops did not influence the parameters examined except for supporting better weight gains in the rats. As with cadmium, arsenic was found to accumulate in rat tissues at a higher level when ingested as arsenic trioxide as compared to naturally bound arsenic in scallops.

PB80-806961 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Iodine in Foods. February, 1974-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Feb 74-Dec 79,
C. Gilbert Young. May 80, 288p
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports dealing with determination, content and effects of iodine in foods and beverages such as milk and water. Methods of determination include utilization of ion-selective electrodes, gas chromatography and neutron activation analysis. I values of fats and oils are reported, as well as effects of iodophor preparations used for washing udders and milk equipment. (Contains 188 abstracts)

PB80-806979 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Retortable Food Pouches. January, 1972-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Dec 79,
Edward Ketchledge. May 80, 48p
Sponsored in part by National Technical Information Service, Springfield, VA.

This report deals with various aspects of retortable food pouches, including their production, technology, testing, sterilization, storage stability and numerous application. (Contains 45 abstracts)

PB80-806995 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Microwave Home Cooking. January, 1972-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Dec 79,
C. Gilbert Young. May 80, 158p
Sponsored in part by National Technical Information Service, Springfield, VA.

Many subjects relating to microwave home cooking are covered in these citations from the world food literature. Home microwave cooking, oven design and safety, and leakage of microwaves, are discussed. The relative effects on food flavor, nutrient content, and residual spore and bacterium count when processed by microwave versus conventional cooking means, are delineated. A number of cookbooks and recipe books specifically designed for use with a home microwave oven, are listed. (Contains 164 abstracts)

PB80-807001 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Zinc in Foods. September, 1976-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Sep 76-Dec 79,
C. Gilbert Young. May 80, 170p
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography cites reports on zinc in foods and beverages (eg. meat, fish, grains, milk, and tea) including zinc content, analysis and determination, bioavailability, and effects on humans and animals. (Contains 168 abstracts)

PB80-807027 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Food Colorants. September, 1977-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Sep 77-Dec 79,
Edward Ketchledge. Jun 80, 176p
Sponsored in part by National Technical Information Service, Springfield, VA.

In these reports, the use, detection, and identification of natural and synthetic food colorants are presented. The techniques for isolating food colorants, U.S. and foreign health laws and regulations, qualitative and quantitative studies of food dyes, and the toxicity and effects of food colorants are also presented. (Contains 200 abstracts)

PB80-807035 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Meat Flavor. July, 1976-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jul 76-Dec 79,

Edward Ketchledge. Jun 80, 181p
Sponsored in part by National Technical Information Service, Springfield, VA.

Factors affecting meat flavor are enumerated in the cited abstracts. Some of these are the animal feed and its additives, processing methods, meat additives and flavorants, storage time and conditions, and methods of meat preparation for eating. Techniques for introducing a meat-like flavor into non-meat foods are described. (Contains 195 abstracts)

PB80-807043 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Meat Stabilizers. January, 1972-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Dec 79,
Edward Ketchledge. Jun 80, 32p
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations, from an eight-year retrospective survey of the world's literature on food, are on meat stabilizers. Sources and types of stabilizers, and the resultant effects on the meat product, are described. The possible carcinogenic, and other, effects on humans of consumption of stabilizers are discussed. (Contains 23 abstracts)

PB80-807050 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Beverage Flavors. June, 1978-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jun 78-Dec 79,
Edward Ketchledge. Jun 80, 183p
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited works discuss the natural and artificial flavors of beverages such as wine, beer and other alcoholic drinks, tea and coffee, soft drinks, natural or mineral waters, and vegetable juices. Sources of the flavorants, their production and introduction, possible carcinogenicity, and regulations governing their use are discussed. (Contains 200 abstracts)

PB80-807076 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Dairy Food Flavors. April, 1978-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Apr 78-Dec 79,
Edward Ketchledge. Jun 80, 184p
Sponsored in part by National Technical Information Service, Springfield, VA.

The cited works from the world food literature discuss flavor in various dairy products, including yoghurt, butter, milk, cheese, ice cream, cream and cottage cheese. Sources, methods of introduction, modification or elimination, possible health effects, and regulations on use of flavorants are covered. (Contains 200 abstracts)

PB80-807084 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fruit Flavors. November, 1976-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Nov 76-Dec 79,
Edward Ketchledge. Jun 80, 197p
Sponsored in part by National Technical Information Service, Springfield, VA.

This selection of citations covers fruit flavors, including fruit juices and fruit-flavored foods such as yoghurts and other dairy products. Also included are abstracts covering grape, apple, and other wine-base fruits, and their flavor impact on the resultant product. (Contains 198 abstracts)

PB80-807092 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Vegetable Flavors. January, 1974-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 74-Dec 79,
Edward Ketchledge. Jun 80, 187p
Sponsored in part by National Technical Information Service, Springfield, VA.

In these reports various vegetable flavorants, and the flavor of many types of vegetables, are discussed. The effect of vegetable processing, packaging and preparation on the resultant flavor, and flavor measurement techniques, are described. (Contains 189 abstracts)

PB80-807100 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Food and Bakery Sweeteners. April, 1977-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Apr 77-Dec 79,
Edward Ketchledge. May 80, 159p
Sponsored in part by National Technical Information Service, Springfield, VA.

Developments in artificial sweeteners are presented in this report, including production, technology, analysis and various applications, such as in dietetic foods and chewing gum. Studies on the toxicity, mutagenicity, carcinogenicity and cariogenicity of sweeteners are also discussed. (Contains 200 abstracts)

PB80-807118 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
The Use of Soy Protein in Foods. February, 1979-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Feb-Dec 79,
Edward Ketchledge. Jun 80, 191p
Sponsored in part by National Technical Information Service, Springfield, VA.

The use of soybean protein fractions as a food protein addition, or replacement, is described in the cited works. Sources of the soy protein, its introduction into many foods, and problems of contamination, are discussed. Determinations of nutritive value are also covered. (Contains 200 abstracts)

PB80-807126 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pesticide Residues in Foods. February, 1979-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Feb-Dec 79,
Edward Ketchledge. May 80, 167p
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations from the world food literature discuss the appearance of pesticides or pesticide residues, in foods destined for human consumption. The foods discussed include fruits and vegetables, meats, dairy products, and seafoods. Pesticide levels, measurement methods, possible carcinogenicity and toxicity, and legislation on pesticide use, are also covered. (Contains 174 abstracts)

PB80-807167 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Bread Making and Bread Products. May, 1979-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for May-Dec 79,
C. Gilbert Young. May 80, 181p
Sponsored in part by National Technical Information Service, Springfield, VA.

These citations from the world food literature cover bread: the growth and processing of the components making up the final bread product, the formulation and baking of the product, and the treatment or coating of the product, its packaging, and its marketing, selling and distribution. (Contains 197 abstracts)

PB80-807209 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Aflatoxin Determination in Foods. September, 1978-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Sep 78-Dec 79,
C. Gilbert Young. Jun 80, 135p
Sponsored in part by National Technical Information Service, Springfield, VA.

In these reports, a description of the methods, procedures, and techniques to detect, identify, separate, analyze, and quantify aflatoxins and their derivatives in foods and other products or substances are presented. The reports also present practical standards for preparation and checking of standard aflatoxin solutions, variations in aflatoxin production, suggestions on prevention of aflatoxin formation, and sampling techniques for determination of aflatoxin in foods. (Contains 200 abstracts)

PB80-807266 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Tea: Production, Use, and Health Effects. March, 1977-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Mar 77-Dec 79,
C. Gilbert Young. May 80, 161p
Sponsored in part by National Technical Information Service, Springfield, VA.

The cited references from the worldwide literature cover the growth, processing, marketing and selling, storage, distribution, and use of many types of tea. Decaffeination and tea substitutes are also covered. The appearance of useful impurities such as fluoride, and possibly harmful impurities such as DDT and trace metals are mentioned. (Contains 199 abstracts)

PB80-807308 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Food Aroma. June, 1978-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jun 78-Dec 79,
C. Gilbert Young. May 80, 191p
Sponsored in part by National Technical Information Service, Springfield, VA.

Cited works discuss the aroma, or odor, of foods, food products and food constituents, and the resultant impact on taste. Techniques for measuring the volatile components of foods by gas chromatography, mass spectroscopy, gas-liquid chromatography (GLC), and other techniques, are described. Psychological (or human) response effects of aroma are also discussed. (Contains 200 abstracts)

PB80-807316 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Keeping Quality of Stored Foods. May, 1974-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for May 74-Dec 79,
C. Gilbert Young. Jun 80, 207p
Sponsored in part by National Technical Information Service, Springfield, VA.

New foods are continually entering the marketplace in the form of those not previously exported, developments in prepared foods and those new in the sense of packaging and preservation methods. This bibliography covers the storage properties of many foods with new and interesting information on the related areas of preservation methods, nutrition, flavor, and packaging. The foods covered vary significantly but include fish, fruit, vegetables, processed meats, bread, milk, eggs, flour, nuts, prepared foods and dried foods. Study data relates to storage methods including plastic bags, carbon dioxide, preservatives, wax coatings, ionized air, chemical treatments or dipping, irridiation, as well as temperature, moisture and atmosphere. Results are expressed in product quality parameters which may be physical, chemical or sensory changes, plus bacteria or other contamination. (Contains 197 abstracts)

PB80-807324 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Baby Food. November, 1972-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Nov 72-Dec 79,

C. Gilbert Young. May 80, 147p
Sponsored in part by National Technical Information Service, Springfield, VA.

The production, sale and use of baby foods over much of the world is treated in these citations. Abstracts include those dealing with additives, vitamin content, nutritional value and contaminants. Manufacturing, packaging, and marketing subjects are also included. (Contains 144 abstracts)

PB80-807381 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
The Turkey Industry. November, 1974-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Nov 74-Dec 79,
C. Gilbert Young. May 80, 193p
Sponsored in part by National Technical Information Service, Springfield, VA.

The production and use of food products from the turkey, and the growth of turkeys, are the broad subjects covered in this retrospective bibliography from the world food literature. Various forms of turkey-based food preparation are described. Discussion of contaminants sometimes found in turkey products is also included. (Contains 184 abstracts)

PB80-807407 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
The Beer Manufacturing Industry. February, 1976-December, 1980 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Feb 76-Dec 80,
C. Gilbert Young. May 80, 175p
Sponsored in part by National Technical Information Service, Springfield, VA.

Documents included in this report cover nearly all aspects of beermaking, from raw materials to production equipment and techniques. Methods of work processing are discussed, with numerous articles on fermentation, enzymes, yeasts, microorganisms, and bacteria. Quality control and instrumentation are included, as well as various articles on low alcohol, low calorie beers. (Contains 200 abstracts)

PB80-807415 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
The Use of Infrared in the Food Industry. August, 1974-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Aug 74-Dec 79,
C. Gilbert Young. Jun 80, 190p
Sponsored in part by National Technical Information Service, Springfield, VA.

In these reports, the use and applications of infrared techniques and devices, such as reflectance spectroscopy, or measurement, in the food industry are presented. The reports cover preparation, processing, production, analysis, testing, quality control, and other aspects connected with food products. (Contains 200 abstracts)

PB80-807423 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
The Use of Herbicides in Food Production. November, 1976-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Nov 76-Dec 79,
C. Gilbert Young. May 80, 182p
Sponsored in part by National Technical Information Service, Springfield, VA.

The common use of chemical weed control, or herbicides, impacts the food industry in several ways: growth of the food plants is also effected; the nutritional and vitamin content levels of the foods can be altered; the germination ability of the plant seeds is frequently changed; and most importantly, there are inevitable residues in the food product. Measurements of these residues, and tests of their effect on rats, are featured in the cited articles. (Contains 200 abstracts)

PB80-807456 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Meat Processing. January, 1972-November, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Nov 79,
Thomas Jones. Jun 80, 139p
Sponsored in part by National Technical Information Service, Springfield, VA.

In these reports, the production and packaging processes of fresh meat, meat products and substitutes are presented. The reports also include meat processing control and inspection systems and maintenance of meat processing facilities. (Contains 164 abstracts)

PB80-807464 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Dairy Product Processing. January, 1972-December, 1978 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Dec 78,
Thomas Jones. Jun 80, 101p
Sponsored in part by National Technical Information Service, Springfield, VA.

A wide variety of articles are covered under the general topic of processing dairy products. Product forms include milk, cream, butter, cheese, milk fats, yoghurt and similar fermented products. Specific subjects include automation, process control, instrumentation, pasteurization, homogenization, enzyme processing, sterilization, quality control, waste processing, preparation methods, new equipment and variety of new food products. Additional articles cover topics dealing with molds, bacteria, fermentation, nutrients, ultrafiltration and membrane separation. (Contains 98 abstracts)

PB80-807472 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Vegetable Processing. January, 1972-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 72-Dec 79,
Thomas H. Jones. Jun 80, 152p
Sponsored in part by National Technical Information Service, Springfield, VA.

The bibliography covers processes for obtaining vegetable products, including vegetable oils and proteins, as well as further processing of such products, including coloring, storage and preservation (eg. canning, drying, freezing, freeze-drying) and packaging. (Contains 166 abstracts)

PB80-807480 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Poultry Food Processing. January, 1971-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jan 71-Dec 79,
Thomas Jones. Jun 80, 39p
Sponsored in part by National Technical Information Service, Springfield, VA.

A variety of food science articles is presented on the commercial processing of poultry. Practical methods and techniques cover mechanical separation of carcasses, sterilization by heat or irradiation, fat rendering, quick freezing, freeze drying, spray cooling and refrigeration. Additional articles cover new food products, cooking and frying methods and flavoring improvements. (Contains 33 abstracts)

PB80-807498 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Yogurt Manufacturing. June, 1975-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Jun 75-Dec 79,
Thomas Jones. Jun 80, 175p
Sponsored in part by National Technical Information Service, Springfield, VA.

This document presents a comprehensive bibliography of all phases of yogurt processing and manufacturing, including yogurt drinks and frozen yogurt products. Technical depth includes extensive data on starters and cultures plus other aspects of microbiology, microflora, antibiotics and other subjects dealing with fermentation. Broader subjects deal with automation and continuous processing down to specific processes such as ultrafiltration and spray-drying. Methods to improve quality and reduce costs are numerous as are the various aspects of acidity as related to fermentation. (Contains 198 abstracts)

PB80-807506 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Detection of Mycotoxins. February, 1975-December, 1979 (Citations from the Food Science and Technology Abstracts Data Base).
Rept. for Feb 75-Dec 79,
Thomas Jones. Jun 80, 177p
Sponsored in part by National Technical Information Service, Springfield, VA.

In these reports, a description of the methods, procedures, and techniques to detect, identify, separate, analyze, and quantify mycotoxins and their derivatives in foods and other products or substances are presented. The reports also present studies, investigations, tests, and evaluations of mycotoxins and their derivatives. (Contains 200 abstracts)

6J. Industrial (Occupational) Medicine

PB80-176423 PC **E04**/MF **A01**
San Francisco Bay Area Resource for Cancer Epidemiology, Oakland, CA.
Occupational Mortality in the State of California, 1959-1961.
Research rept.,
Gerald R. Petersen, and Samuel Milham, Jr. Jan 80, 88p DHEW/PUB/NIOSH-80-104
Contract N01-CP-3-3353
Prepared in cooperation with Washington State Dept. of Social and Health Services, Olympia.

This report details the occupational and mortality patterns of approximately 200,000 white male residents of California for the period 1959 to 1961, and concludes that occupation can be useful in explaining and interpreting mortality trends; but other factors, such as social and behavioral patterns, may be more important in some cases since it is well known that people do not randomly select their means of support and industry does not randomly hire employees. The detailed mortality-related statistics derived from death certificates of workers in 125 occupations are furnished in six microfiche as part of the report. They include such information as average age at death, average years worked, and specific causes of death within an occupation that proved to be abnormally high when compared with the same proportional mortality rate of the entire white male population (15-64 years of age) in California. The data in this report are compared with data from similar occupational mortality reports from Washington State (1950-71), England and Wales (1949-53/1959-63), and the U.S. (1950). In most instances, California results agree with the other results reported.

PB80-176803 PC **A06**/MF **A01**
Radian Corp., Austin, TX.
Evaluation of Paul Bergsoe and Son Secondary Lead Smelter.
Final rept. Oct 78-Oct 79,
Richard T. Coleman, Jr., and Robert Vandervort. Jan 80, 112p EPA-600/2-80-022
Contract PHS-NIOSH-210-77-0008

This report presents the findings of an investigation performed to obtain data concerning fugitive and workroom emissions from secondary lead smelters. The results are being used within both NIOSH and EPA as part of a larger effort to define the potential workplace/environmental impact of emissions from this industry segment and the need for improved controls. The findings will also be useful to other agencies and the industry in dealing with control problems. Either the Metals and Inorganic Chemicals Branch of the USEPA or the Division of Physical Science and Engineering of NIOSH should be contacted for any additional information desired concerning this program.

PB80-181035 PC **A05**/MF **A01**
Occupational Safety and Health Administration, Washington, DC. Office of Statistical Studies and Analysis.
Occupational Fatalities Related to Fixed Machinery as Found in Reports of OSHA Fatality/Catastrophe Investigations,
Carol Mancini Vira, and William W. Cloe. May 78, 90p OSHA/RP-80/001

Reports of OSHA fatality/catastrophe investigations have been cited as an underutilized source of information on how workplace incidents occur. This study analyzes these reports on fatalities related to fixed machinery for 1974-1976, highlighting problem areas of interest for standards setting, compliance efforts, and safety inspector training. Incidents are classified by the type of activity primarily responsible for the incident operation procedures, accidental activation, machine deactivation, equipment failure, and other. Secondary factors, not necessarily recognized as problems in the investigation reports, are identified. Citations issued as a result of incidents are examined to determine gaps in current OSHA standards. Fifty eight case studies are presented. The approach outlined in this report for classifying incidents and utilizing the investigation reports can be applied to study other types of occupational fatalities if problems with the uniformity, consistency, and quality of data collected in fatality investigations are addressed.

PB80-182009 PC **A05**/MF **A01**
Occupational Safety and Health Administration, Washington, DC. Office of Statistical Studies and Analysis.
Occupational Fatalities Related to Scaffolds as Found in Reports of OSHA Fatality/Catastrophe Investigations,
William W. Cloe, and Patricia P. Breslin. May 79, 98p OSHA/RP-80/002

This study of scaffold related fatalities continues the utilization of reports of OSHA fatality/catastrophe investigations as a useful source of information on how workplace incidents occur. Covering a period 1974-1978, it highlights problem areas of interest for standard setting, compliance efforts, and safety inspection training. Incidents are classified by the type of activity primarily responsible for the incident; equipment failure, operating procedure, environmental conditions or other. In addition, the employee activity at the time of the incident is examined. Citations issued having direct bearing on the incident are presented to determine gaps in current OSHA standards. Forty-two case studies are included. Also included, but not in the main analysis, are cases involving incidents that are similar to those of scaffolds, e.g., the use of pallets on forklift trucks. In practically all cases the fatality resulted from a fall from an elevation resulting in fractures to the head and body. These falls may have been prevented by the proper use of scaffold guarding and personal fall protection--lifeline, lanyard and belt. The employer is cited for these violations.

PB80-187651 PC **A11**/MF **A01**
National Library of Medicine, Bethesda, MD.
Industrial Noise Pollution and Hearing Impairment, Problems of Prevention Diagnosis and Certification Criteria,
Wieslaw J. Sulkowski. c1980, 246p TT-76-54047
Trans. of Polish Jnl. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

Contents:
- Acceptable noise exposures - Damage risk criteria;
- Prevention - Technical prophylactic means. Ear protectors;
- Audiometry in prevention of occupational hearing impairments;
- Diagnosis and certification of occupational hearing impairments.

PB80-190150 PC **A03**/MF **A01**
Tracor Jitco, Inc., Rockville, MD.
Vinyl Fluoride and Vinyl Bromide Industrial Hygiene Survey Report.
Technical rept.,
R. E. Bales. Nov 78, 30p DHEW/PUB/NIOSH-79-111
Contract PHS-NIOSH-210-75-0064

Industrial hygiene surveys were conducted at a vinyl fluoride (75025) (VF) manufacturing facility, a VF polymerization facility, and a vinyl bromide (593602) (VBr) manufacturing company from March to June, 1977 to determine worker exposures to these substances and to document engineering controls, work practices, administrative controls, and biological and environmental sampling requirements used by the companies. Exposures for VF production operators were less than 2 parts per million (ppm); potentially higher exposures were possible during operations start up. In the VF polymerization facility, time weighted average (TWA) exposures to VF for polymer operators were 1 to 5ppm, with an average of 1.9ppm. In the VBr factory, the median TWA exposure to VBr for operators was 0.27ppm. For a loading crewman at this factory exposure was 6.3ppm over a 1 hour period. The author concludes that the integrity of the process systems is maintained sufficiently in all facilities to present minimal exposure hazards to workers. Measures recommended to minimize exposure include the institution of a surveillance program; the design and installation of leak resistant, enclosed process systems; provision of respiratory protection and protective clothing; employee education and training; installation of eyewash fountains and emergency showers; and the use of personal protective equipment to minimize skin and eye contact with the chemicals.

6K. Life Support

N80-22987/5 PC **A03**/MF **A01**
Life Systems, Inc., Cleveland, OH.
Performance Characterization of a Bosch CO sub 2 Reduction Subsystem.
Final Report.
D. B. Heppner, T. M. Hallick, and F. H. Schubert. Feb 80, 40p NASA-CR-152342, LST-TR-379-11
Contract NAS2-10204

The performance of Bosch hardware at the subsystem level (up to five-person capacity) in terms of five operating parameters was investigated. The five parameters were: (1) reactor temperature, (2) recycle loop mass flow rate, (3) recycle loop gas composition (percent hydrogen), (4) recycle loop dew point and (5) catalyst density. Experiments were designed and conducted in which the five operating parameters were varied and Bosch performance recorded. A total of 12 carbon collection cartridges provided over approximately 250 hours of operating time. Generally, one cartridge was used for each parameter that was varied. The Bosch hardware was found to perform reliably and reproducibly. No startup, reaction initiation or carbon containment problems were observed. Optimum performance points/ranges were identified for the five parameters investigated. The performance curves agreed with theoretical projections.

6L. Medical and Hospital Equipment

N79-79806/2 PC **A03**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Development of Improved Automatic Defibrillator Systems.
Technical development plan.
28 Aug 78, 38p

Built-in weaknesses of health care systems, as well as the recent favorable experience with transvenous demand pacemakers, have resulted in an approach to the problem of prevention of sudden death by means of an electronic device whose chief purpose is to recognize ventricular fibrillation in a patient in whom it would be implanted, and thereupon to defibrillate his heart automatically. It is expected that this device, an automatic implantable defibrillator (AID), will eventually be adapted for permanent implantation as well as for temporary use in patients particularly prone to develop ventricular fibrillation and thus provide them with some degree of protection from sudden coronary death.

N80-22573/3 PC **A04**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
A Device for Tracking the Fundamental Frequency of Speech and Its Application in the Assessment of Strain in Pilots and Air Traffic Controllers.
J. B. Peckham. May 79, 56p RAE-TR-79056, BR69831

The use of speech signals for assessing physiological and psychological changes resulting from strain in pilots and air traffic controllers is discussed. A device is described which tracks the fundamental frequency of the speech signal in order to quantify changes in the parameter due to strain is described.

N80-22975/0 PC **A03**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Bonn (Germany, F.R.). Inst. fuer Flugmedizin.
Evaluation of Thyroid Hormones by Gas Chromatography.
W. Raabe. Jan 79, 26p DFVLR-FB-79-07
Text in German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-620).

Gas chromatography is discussed as a method to allow routine measurements of thyroid hormone concentration in human serum. It is shown that current methods using this technique are not sufficiently sensitive. A proposal is made to improve the sensitivity of the method by the use of vacuum techniques. A factor of 1000 in sensitivity gain is expected.

PB80-176894 PC **A06**/MF **A01**
Southern Research Inst., Birmingham, AL.
Development of Improved Materials for Extraoral Maxillofacial Prostheses.
Final rept. May 74-May 79,
Donald R. Cowsar, Danny H. Lewis, and Richard L. Dunn. 14 Dec 79, 108p SORI-EAS-79-801, NIDR/CR-80/5
Contract N01-DE-4-2435
See also PB-268 663.

An arylene silicone polymer, polytetramethylsilphenylenesiloxanedimethylsiloxane was synthesized and formulated as a pourable, viscous, room-temperature-vulcanizing liquid for use in fabricating extraoral maxillofacial prostheses. Silphenylene polymers are colorless and will accept either intrinsic or extrinsic coloration. When mixed with conventional catalysts, the silphenylene vulcanizates can be easily and reliably cast in closed dental stone molds to give strong yet soft and pliable prostheses. Typical values for tensile strength, elongation at break, modulus at 100% elongation, and hardness are, respectively, 1400 psi, 1000%, 50 psi and 35 (Shore A). The silphenylene elastomers have an excellent tactual, as well as visual resemblance to skin, and they adhere well to medical tapes and adhesives. Animal tests indicate that the dermal and ocular toxicity of the components of the silphenylene clinical kits and the cured elastomer are low. Clinical evaluation showed silphenylene to be an improved prosthetic material with the possibility of widespread use if the tear strength were improved.

PB80-178064 Not available NTIS
National Bureau of Standards, Washington, DC.
Optimizing Creep and Corrosion Properties in a Dispersant Amalgam Using Manganese.
Final rept.,
R. M. Waterstrat. Oct 78, 3p
Grant PHS-DE-02455
Pub. in Jnl. Dent. Res., v57 n9-10 p873-875 Sep/Oct 78.

It is shown that the creep behavior of a commercial dispersant-amalgam containing copper is improved by the addition of a manganese-containing alloy. This improvement is apparently obtained without any serious changes in corrosion resistance, provided that no more than 20% of the Mn alloy is added.

PB80-182736 PC **A04**/MF **A01**
Franklin Research Center, Philadelphia, PA.
Fabrication and Characterization of Grafted Hydrogel Coatings Prepared by Active-Hydrogen Techniques for Vascular Devices.
Final rept. 1971-79,
Paul L. Kronick. 1979, 72p 2915-F, NIH-N01-HV-1-2017-8

Contract N01-HV-1-2017

The problem of making the surfaces of plastics used for vascular implants compatible with blood was approached by coating them with hydrogels by the atomic-hydrogen grafting method. Early demonstrations of the method showed that the coatings, in some tests, could have minimal platelet and protein deposition and thrombogenesis. The earlier tests from in-vivo, ex-vivo, and in-vitro tests were later confirmed for polypropylene films coated with polyacrylamide. Fibrinogen and Factor XII were adsorbed to the hydrogel without loss of antigenic sites; in-vivo patency is prolonged in the vena-cava ring test, although not in every sample; no acute or sub-acute toxic effects could be demonstrated. It appears that the benign interactions between polyacrylamide and blood, as a material property of the hydrogel, do not entirely compensate for effects of surface texture, which perturb laminar blood flow.

6M. Microbiology:

AD-A083 803/7 PC **A02**/MF **A01**
Connecticut Univ Health Center Farmington Dept of Biochemistry
Biochemical Changes and their Regulation during Spore Formation and Germination.
Final rept. 1 Feb 77-31 Jan 80,
Peter Setlow. 9 Apr 80, 9p ARO-14479-11-L
Grant DAAG29-77-G-0070

Metabolism of several important small molecules has been examined during sporulation and spore germination in Bacillus megaterium. These studies have indicated (1) the major known low molecular weight thiol/disulfide in Bacillus species is Coenzyme A (CoA); (2) CoA in growing or sporulating cells is in either an acyl form or as the free thiol, but that in dormant spores about 75% is in a disulfide form with 50% in disulfide linkage to spore core proteins; these disulfides are cleaved in the first minutes of spore germination; (3) dormant spores contain an NADH-linked disulfide reductase which cleaves CoA disulfides. This enzyme is low or absent from log-phase or early sporulating cells, and appears during sporulation. It has no activity on cystine, glutathione or pantethine, and has highest activity on 4',4''-phosphopantethine; (4) Bacillus megaterium cells contain a very low level of cyclic GMP (cGMP), but cGMP is not found in spores and it appears unlikely to be a modulator of sporulation, germination or outgrowth; (5) The pH within dormant spores is about 6.3, a value which is independent of the external pH. However, early in spore germination the internal pH rises to 7.5; and (6) the key enzyme in regulation of 3-phosphoglycerate (3-PGA) accumulation during sporulation, and its rapid utilization during spore germination (and thus ATP production) is PGA mutase.

6N. Personnel Selection and Maintenance (Medical)

AD-A083 777/3 PC **A22**/MF **A01**
Vought Corp Dallas TX Systems Div
Study to Determine the Impact of Aircrew Anthropometry on Airframe Configuration.
Final rept. 30 Jun 74-31 Oct 76,
E. R. Atkins, R. L. Dauber, J. N. Karas, and T. A. Pfaff. 31 Oct 76, 522p 2-57110/5R-3244, USAAVSCOM-75-47
Contract DAAJ01-74-C-1107

This technical report presents the results of a study to determine the impact of aircrew anthropometry on airframe shape, size, weight, and cost, and their influence on flight performance factors of hover ceiling, maximum rate of climb, and maximum level flight airspeed. Definition of crew station variables was completed for both human factors and machine factors corresponding to various percentile ranges. These defined variables were used to determine the influence the selection of percentile range has on the final airframe configuration in terms of size, weight, performance, and cost. (Author)

6O. Pharmacology

AD-A083 669/2 PC **A02**/MF **A01**
Naval Submarine Medical Research Lab Groton CT
Effects of Pseudoephedrine and Triprolidine on Visual Performance,
S. M. Luria, H. M. Paulson, A. P. Ryan, and C. L. Schlichting. 1979, 6p Rept no. NSMRL-894
Pub. in Aviation, Space, and Environmental Medicine, v50 n11 p1158-1160 Nov 79.

No abstract available.

AD-A084 056/1 Not available NTIS
Flying Personnel Research Committee London (England)
Effect of Alcohol on Performance after Nordiazepam,
A. N. Nicholson. 1978, 15p Rept no. FPRC/1384
Availability: Pub. in Advances in Pharmacology and Therapeutics, v8 p251-262 1978 (No copies furnished by DTIC/NTIS).

No abstract available.

PB80-183692 PC **A19**/MF **A01**
UniWorld Group, Inc., Bethesda, MD.
Comparisons of Consumer Reactions to a Prototype Patient Package Insert for Erythromycin: Washington and Richmond. Volume I: Summary Analysis.
Final rept. Sep-Oct 79,
A. Myers, S. Morris, L. Morris, and J. Guerin. Nov 79, 430p FDA/BD-80/51
Contract FDA-223-78-3010
See also PB80-184054.

The report covers eight focus group sessions conducted by the UniWorld Group for FDA regarding a prototype Patient Package Insert (PPI) for Erythromycin. Volume I contains the major key points and observations made during the discussions. Some key points made during the focus groups centered around physical characteristics, format, tone, readability, level of detail and general content of the prototype used in the group. Volume II and III contain slightly edited transcripts of the eight groups. Participant profiles are included.

PB80-184054 PC **A20**/MF **A01**
UniWorld Group, Inc., Bethesda, MD.
Comparison of Consumer Reactions to Four Prototype Patient Package Inserts for Estrogens: Washington, DC. and Philadephia, Pennsylvania. Volume I: Summary Analysis.
Final rept. Sep-Oct 79,
A. Myers, S. Morris, L. Morris, and J. Guerin. Jan 80, 467p FDA/BD-80/52
Contract FDA-223-78-3010
See also PB80-183692.

The report covers eight focus groups conducted by the UniWorld Group for FDA regarding four prototype patient package inserts for estrogens. Volume I contains key points and observations made during the discussions. Some key points were comments regarding physical characteristics, format, tone, readability, level of detail and general content of the specific prototype used in the particular group. Volume II and III contain edited transcripts. Participant profiles are included.

6P. Physiology

AD-A084 032/2 PC **A03**/MF **A01**
Naval Ocean Systems Center San Diego CA
Replication and Extension of Human Sensory Capabilities in Hearing.
Final rept. Jul-Sep 79,
D. W. Martin. Apr 80, 28p Rept no. NOSC/TD-336

The human auditory system is investigated to determine the parameters necessary to design a remote auditory system. Special attention is given to the development of human localization and unaided echolocation skills. Monaural and binaural localization are examined, as well as dummy head design, and design considerations for an underwater auditory system. Finally, active sonar systems are discussed in terms of their applicability to human sensory capabilities in hearing. (Author)

N80-22971/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Vestibular Recruitment.
S. G. Tsemakhov. Mar 80, 16p NASA-TM-76088
Contract NASW-3198
Transl. into English from Vestn. Otorino-Laringologii (USSR), No. 4, Jul. - Aug. 1979 p 75-83. Transl. By Scientific Translation Service, Santa Barbara, Calif.

Vestibular recruitment is defined through the analysis of several references. It is concluded that vestibular recruitment is an objective phenomenon which manifests itself during the affection of the vestibular receptor and thus serves as a diagnostic tool during affection of the vestibular system.

PB80-178908 PC **A99**/MF **A01**
National Inst. of Mental Health, Bethesda, MD. Lab. of Neurobiology.
Introduction to Electrochemistry of Nerve Membranes,
Ichiji Tasaki. Mar 80, 695p NIMH-80/03

The evolution of physiology of nerve fibers is linked closely with that of electrochemistry. Experimental facts known at the present time are described and interpreted on the basis of present level of understanding of morphology, biochemistry and physical chemistry. Old theories are also discussed in detail for the experimental basis of those theories are still meaningful. The volume is written primarily for students of biology and medicine who are interested in the properties of nerve fibers.

6Q. Protective Equipment

PATENT-4 191 028 Not available NTIS
Department of the Navy Washington DC
Dry Ice, Liquid Pulse Pump Cooling System.
Patent,
Norman F. Audet, and George M. Orner. Filed 22 Jun 78, patented 4 Mar 80, 7p AD-D007 188/6, PAT-APPL-918 203
Supersedes PAT-APPL-918 203-78, AD-D005 232.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A CO2-powered system for cooling garments by conduction cooling when the wearer is subjected to heat stress is provided. A dry ice refrigerant source provides the cooling and the CO2 gas given off during sublimation of the dry ice provides the motive power for a diaphragm type pump which transports heat transfer liquid between the heat source and the refrigerant or heat sink. The system may be interfaced with brine type cooling systems used for food preservation to maintain food temperatures under emergency conditions such as power outages due to its non-electrical energy source. (Author)

PB80-810963 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Helmets: Construction, Effectiveness, and Human Factors. 1964-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-May 80,
Edith Kenton. Jun 80, 195p

The bibliography covers research on a variety of helmets including motorcyclist and bicyclist's helmets, industrial, firefighters, mining, infantry and flightcrew's helmets, police and riot helmets, and swimmer's and diver's protective helmets. Topics cover areas such as the materials used in helmet construction, the development of design criteria, configuration, and components of helmets such as suspension systems, cooling, and goggles. A number of citations deal with performance tests and requirements, test methods, structural and dynamic testing, human factors evaluation, operational efficiency, speech intelligibility, and sound localization. (Contains 188 abstracts)

UCRL-52893 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Glove Permeation by Shale Oil and Coal Tar Extract.
G. O. Nelson, G. J. Carlson, and A. L. Buerer. 14 Feb 80, 13p
Contract W-7405-ENG-48

The vapor penetration of shale oil and coal tar extract through protective gloves composed of either polyethylene, polyvinyl chloride, vinyl, latex, neoprene, Buna-N, acrylonitrile, natural rubber, or nitrile rubber was tested and measured. We used flame ionization techniques to determine the permeation characteristics of the gloves. Neoprene, Buna-N, acrylonitrile and nitrile gloves offered the best protection against the vapors tested. (ERA citation 05:017377)

6R. Radiobiology

AD-A083 735/1 PC **A08**/MF **A01**
Armed Forces Radiobiology Research Inst Bethesda MD
Annual Research Report, 1 July 1976-30 September 1977.
30 Sep 77, 155p Rept no. AFRRI-ARR-11

This report contains a summary of the research projects of the Armed Forced Radiobiology Research Institute for the period 1 July 1976 to 30 September 1977. (Author)

AD-A083 879/7 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Microwave Radiation and Dextroamphetamine: Evidence of Combined Effects on Behavior of Rats.
Medical research progress rept.,
John R. Thomas, and Georgia Maitland. 4 Nov 77, 9p Rept no. NMRI-79-102
Pub. in Radio Science, v14 n6S p253-258 Nov-Dec 79.

No abstract available.

AD-A084 030/6 PC **A13**/MF **A01**
Science Applications Inc Schaumburg IL
Radiation Dose Deposition in the Active Marrow of Reference Man.
Final rept. May 76-Oct 77,
Dean C. Kaul, and Richard Jarka. 31 Oct 77, 286p SAI-121-647-1, DNA-4442F, AD-E300 743
Contract DNA001-76-C-0263

Dose Deposition in the active bone marrow of reference man was calculated using the MORSE Monte Carlo transport Code in the adjoint mode. Calculations were made in a three region reference man phantom described in Combinatorial Geometry. Calculations were performed using cross sections and KERMA factors from the 37 neutron-21 gamma ray group DNA Few Group Library. KERMA factors used in the calculation of dose were those for the constituents of active marrow alone for neutron dose and active marrow plus trabecular bone constituents for photon dose. Dose deposition (or response) functions (rad (marrow) per unit incident radiation fluence) are tabulated in energy differential and angle integral and differential form for gamma ray dose from incident gamma rays and for neutron and gamma ray dose from incident neutrons. Tabulations are for eight skeletal regions and for reference man. The dose deposition factors have been used to determine marrow dose from hypothetical contemporary weapon types and for Little Boy and Fat Man.

AD-A084 055/3 PC **A03**/MF **A01**
Duke Univ Eye Center Durham NC
The Origin of Cataracts in the Lens from Infrared Laser Radiation.
Annual progress rept. 1 Sep 75-31 Aug 76,
M. L. Wolbarsht, B. S. Yamanashi, and M. A. Orr. 20 Jul 77, 34p
Contract DAMD17-74-C-4133

Changes in lens constituents, including proteins, following exposure to laser radiation have been used to detect the earliest changes possible in cataract formation. The results of current experiments are described. Calf, rabbit, rat, pig, and human lenses were incubated at various temperatures between 40-45 C. Purified lens crystallins were also incubated at temperatures from 40-45 C to determine the contribution of thermal elevation to denaturation possibly leading to cataractogenesis. Thin film gel electrophoresis, column chromatography, electron probe x-ray microanalysis, and amino acid separation were the analytical methods used on the incubated lenses, as well as lenses from rabbit eyes exposed to a 1.06 micrometers CW neodymium laser in vivo. (Author)

ARL-TR-003 PC **A02**/MF **A01**
Australian Radiation Lab., Melbourne.
Preparation and Quality Control of Technetium-99M Radiopharmaceuticals.
D. L. Samuels. Nov 78, 14p
U.S. Sales Only.

Appropriate procedures for the production and quality control of technetium-99m based radiopharmaceuticals in hospital radiopharmacy consistent with the recently published Australian Code of Good Manufacturing Practice are discussed. (Atomindex citation 10:481719)

CONF-790249-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Pathogenic Mechanism in Lung Fibrosis.
H. Witschi, W. M. Haschek, K. R. Meyer, R. L. Ullrich, and W. E. Dalbey. 1979, 22p
Contract W-7405-ENG-26
International conference on occupational lung disease, San Francisco, CA, USA, 27 Feb 1979.

The purpose of the study was to examine whether an interaction between two agents causing alveolar epithelial damage would produce lung fibrosis. In mouse lung, intraperitoneal injection of the antioxidant butylated hydroxytoluene causes diffuse alveolar type I cell necrosis, followed by proliferation of type II alveolar cells. In animals exposed to 70% O sub 2 or 100-200 rad x rays during the phase of type II cell proliferation following BHT, diffuse interstitial lung fibrosis developed within 2 weeks. Quantitative analysis of the lungs for hydroxyproline showed that the interaction between BHT and O sub 2 or x rays was synergistic. If exposure to O sub 2 or x rays was delayed until epithelial recovery was complete, no fibrosis was seen. Abnormally high levels of lung collagen persisted up to 6 months after one single treatment with BHT and 100 rad x rays. A commonly seen form of chronic lung damage may thus be caused by an acute interaction between a bloodborne agent which damages the alveolar cell and a toxic inhalant or x rays, provided a critically ordered sequence of exposure is observed. (ERA citation 05:016773)

IAEA-R-1161-F MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Irradiation Studies of Local Streptomyces Strains for Higher Antibiotic Producing Capacity. Part of a Coordinated Programme on Radiation Microbiology. Final Report, for the Period 1 April 1974-30 June 1977.
Q. L. Kintanar. Jun 78, 22p
U.S. Sales Only. Microfiche copies only.

The 14 mutants produced by sequential exposure to gamma and ultraviolet irradiation were found to belong to different fundamental types of variants differing in morphology, stability, and metabolite spectra from the parent strain. The first hour mutants, M-1 to M-4 could be considered as belonging to the first category of mutants. Metabolites produced were the same as the parent but differ only in quantity. One was a morphological mutant, M-4 which differed from the parent strain in the production of a brown pigment and conidia, and lack of aerial mycelium. It was found to be most stable and capable of producing high antibiotic yield. The rest of the mutants, M-5 to M-14 could be grouped in the second category. The synthesis of one or more metabolites of the parent strain has been lost by mutation. Unexpectedly, a mutant, M-9 instead of synthesizing either oxytetracycline or tetracycline produced chlortetracycline. Coconut water was found inhibitory to the production of antibiotics by the parent strain and the high and low producing mutants. Modifying the medium by incorporating phosphate and adjusting the initial pH to 4.75 raised the antibiotic yield of the 10% coconut water supplemented medium of M-4 more than the control. Higher pH than the optimum shortened the lag phase but reduced the antibiotic yield while a lower initial pH prevented the growth of the organism giving negligible yield. A reduction of pH to pH 4.5 for the initial 48 hours lengthened the lag phase with almost no adverse effect on the yield. The incorporation of large amounts of coconut water aggravated the amino acid imbalance of the medium. (Atomindex citation 10:423349)

INIS-mf-4331 PC **A03**/MF **A01**
Kiel Univ. (Germany, F.R.). Abt. Hygiene und Mikrobiologie.
Survival Time of Bacteria on Different Plastics by Application of Ultraviolet Rays and Desinfectants.
Diss. (M.D.),
S. Glueck. 2 Dec 75, 41p
In German.
U.S. Sales Only.

The survival times of four sorts of germs were studied (Staph. albus, Staph. aureus, E.coli and Clebsiella) on 28 different plastic surfaces under different ambient conditions, (darkness, daylight, UV-radiation) and after preceding disinfection of the surfaces. For these studies, a formaldehydecontaining, phenolic, and a surface-active preparation were used. No essential differences in the survival times of the 4 types of germs tested were found. Besides the chemical basic structure additional substances were found to play a substantial role for the autobactericides. The dark values which could help to obtain findings about auto-bactericides did not show significant correspondence within the groups of the plastics. Only for a few materials a safe auto-bactericide could be found (alkyd lake, phenol resin). In the case of some other substances (some preparations made of PVC, polystyrene, polyacetal) an effect on the germs could be seen which was, at least totally seen, unfavourable, if all test conditions (darkness, daylight, UV-radiation) are viewed as a total. As comparative values on glass had shown a lower lethal rate of the germs, a certain auto-bactericide is likely to exist in all plastics tested. A considerable antibacterial effect of daylight was found, even with low daylight quotients and clased windows. UV-rays also diminished the number of germs on the plastic surfaces considerably, even with only indirect irradiation. Delayed effects of disinfecting agents partially depend on the surface material. Thus the phenolic agent showed strong delayed effects on the acryl glas, polyethylene, phenol resin, polycarbonate, but less on PVC. Phormaldehyde showed a good long-term effect only on phenol resin. (Atomindex citation 09:391664)

INIS-mf-4339 PC **A03**/MF **A01**
Karlsruhe Univ. (Germany, F.R.). Fakultaet fuer Bio- und Geowissenschaften.
Proliferation Kinetics and Survival of Mammal Cells after Treatment with Radiation of Various Ionization Densities and with Hyperthermia.
Diss. (D.Sc.),
H. Schlag. 29 Jun 77, 37p
In German.
U.S. Sales Only.

Survival and proliferation kinetics of chinese hamster cells after Co- gamma -, pi exp - -meson irradiation, hyperthermia (40 - 43 exp 0 C), and a combination of Co- gamma irradiation and hyperthermia were studied in this paper. After gamma -irradiation, exponential-phase and stationary-phase cells showed equal survival rates for equal doses. Cytofluorometric analysis showed that there was a dose-dependent delay in the synthesis phase with subsequent cell blocking in the G sub 2 +M phase. After irradiation with pi exp - mesons, there is a dose-dependent accumulation in the G sub 2 +M phase, with a RBE of 2.2. The different response of S-phase cells to radiations of different LET may be explained with the inactivation kinetics typical of each type of radiation. The effectiveness of hyperthermal treatment depends on the stage of growth of the cells. A temperature of 40 exp 0 C does not induce cell killing, not even after prolonged exposure. After 7 hours' exposure to 41 exp 0 C, on the other hand, 80% of the cells are killed after blocking in G sub 2 + M. Exposure to 42 exp 0 C for 1-2 h induces a synchronisation effect which is induced by a block in S and G sub 2 + M. After exposure to 42 exp 0 C for 4 h, however, the cells blocked in S are killed in this phase. Combination of Co- gamma radiation leads to increased cells killing and also to sensitization, especially of cells in the exponential growth stage. The proliferation kinetics effects of this combined treatment are the same as after pion irradiation. (Atomindex citation 09:391652)

INIS-mf-4340 MF **A01**
Technische Univ. Hanover (Germany, F.R.). Fakultaet fuer Mathematik und Naturwissenschaften.

UV Dosimetry in Pollen of Pinus Silvestris and Stimulation Studies of Pollen Tube Growth after Irradiation with UV and Ionizing Radiations.
Diss. (D.Sc.),
H. W. Seibold. 1 Nov 76, 131p
In German.
U.S. Sales Only. Microfiche copies only.

Pollen tube growth after exposure to UV- and ionizing radiation was investigated in Pinus silvestris as a function of different parameters. The preconditions for this are an exact UV dosimetry and the conversion of the UV dose of (erg) into (rad). In spite of the fact that the calculation methods are theoretically already well known, the experimental determination of the absorbed energy dose, in particular the absorption factors, was complicated by the morphological structure of the pollen. The total-irradiation experiments showed that the stimulation and inhibition of pollen tube growth is highly dependent on the dose/dose rate region chosen. Stimulation is highly dependent on the dose rate after UV irradiation as well as after exposure to ionizing radiation. When the dose rates are very small, the values are practically the same as in non-irradiated controls; with increasing doses rate, stimulation increases, whereas at very high dose rates only growth inhibition is observed. After exposure to ionizing radiation, the quantum energy or wavelength of the radiation has no effect on tube growth; after UV irradiation, on the other hand, there is hardly any stimulation at short wavelengths. As these observations were not sufficient for drawing conclusions on the site of the stimulatory action, partial UV exposure with separate irradiation of the two nuclei and the cytoplasm was also carried out. Stimulation was found in each of the three irradiation sites; although nuclei and cytoplasma react differently and also differ in the initial reaction stages, there is always an anhancement of pollen tube growth. These findings are compared with some of the current hypotheses for an explanation of the stimulatory effect. (Atomindex citation 09:391655)

INIS-mf-4342 PC **A05**/MF **A01**
Karlsruhe Univ. (Germany, F.R.). Fakultaet fuer Bio- und Geowissenschaften.
Antigen-Antibody Reactions of Uv-Irradiated Phage DNA.
Diss. (D.Sc.),
A. Fink. 12 May 76, 77p
In German.
U.S. Sales Only.

The observation of others could be confirmed that uv-irradiated DNA is a better immunogen than unirradiated DNA. The author's immune sera contained a high amount of antibodies with a specific action against photoproducts in the DNA. The thymine dimer was identified as a relevant photoproduct and thus as antigenic determinant. In comparison, the amount of unspecific antibodies reacting with denaturated DNA was low and varied between sera. Thymine-dimer antibodies showed a high specificity without cross-reaction with other pyrimidine dimers such as anti CC and anti CT; they belong to the class of IgG molecules. Irradiated dinucleotide dTpT is sufficient to induce the formation of antibodies reacting with the cis-syn thymine dimers in uv-irradiated DNA. Antibody binding is proportional to the uv doses applied to the DNA. When using completely denaturated DNA, there is a linear increase changing into a plateau at higher doses. The extent of antigen-antibody binding is strongly dependent on the degree of denaturation of the DNA. With increasing denaturation, the antibody binding of the DNA increases. The antigen-antibody reaction can thus be used to estimate the degree of denaturation of the DNA. There were no signs of an influence of the degree of denaturation of the DNA on the quantum yield of thymine dimers. The different amounts of antibodies are therefore due to the masking of thymine dimers in native DNA. When irradiating intact phage particles, there was no sign of an influence of the phages' protein covers on the antibody binding capacity of DNA compared with DNA irradiated in vitro. (Atomindex citation 09:394993)

INIS-mf-4353 PC **A08**/MF **A01**
Universitaet Honenheim (Landwirtschaftliche Hochschule) (Germany, F.R.). Inst. fuer Allgemeine Lebensmitteltechnologie und Technische Biochemie.
Combined Effect of Water Activity, Radiation Dose, and Temperature During Irradiation on the Survival of Three Salmonella Serotypes.
Diss. (D.Sc.),
A. E. Moussa. 15 Nov 77, 157p
In German.
U.S. Sales Only.

Stationary-phase cells of S. typhimurium, S. thompson, and S. senftenberg were irradiated at room temperature with 10 MeV electrons, either in water or in glucose, glycerine, NaCl, CaCl sub 2 , or LiCl solutions of different concentrations. Further experimental parameters, i.e. the temperatures O exp 0 C and 50 exp 0 C, were investigated in samples whose water activity had been adjusted to certain asub(W) values. Using the sorption isotherm method, different water activities were obtained in egg powder at temperatures of 5 exp 0 C, 25 exp 0 C, and 45 exp 0 C. In all experiments, the survival of Salmonellae was investigated by determining the number of surface germs. In saccharose, glucose, glycerine, and NaCl, the radioresistance of Salmonellae increased with decreasing water activity. There is a linear relation at different temperatures between D sub 10 values and asub(W) values in saccharose and glucose. In glycerine solutions, the D sub 10 values show a steep rise with decreasing asub(W) = 1.0 and 0.9 and a less steep rise below 0.9. Below asub(W) = 0.5, they do not change any further. At asub(W) values below 0,90, CaCl sub 2 and LiCl show a strong cytotoxic effect, independent of irradiation. The higher the temperature on irradiation, the lower will be the radioresistance of Salmonellae. Irradiation at a temperature of 50 exp 0 C showed a synergistic effect. The radioresistance of Salmonellae in egg powder increased with decreasing asub(W) value of the egg powder. When egg powder was irradiated at 45 exp 0 C, there was a strong synergistic effect which is important for practical applications of irradiation in egg powder sterilization. The radioresistance of Salmonellae in egg powder was independent of the serotype. (Atomindex citation 09:395029)

KBS-TR-40 PC **A04**/MF **A01**
Kaernbraenslesaekerhet, Stockholm (Sweden).
Ecological Transport and Radiation Doses from Ground Water Borne Radioactive Matters.
R. Bergman, U. Bergstroem, and S. Evans. Dec 78, 59p
In Swedish.
U.S. Sales Only.

Turnover of radioactive matter entering the biosphere with ground water has been studied with regard to exposure and dose to critical groups and populations. The main alternatives considered for outflow of radioactive effluents to the biosphere are: outflow in a valley containing wells, outflow to a fresh-water lake, and outflow in a coastal region of the Baltic Sea. Mathematical models of a set of coupled ecosystems on local, regional- intermediate- and global levels have been used for calculations of doses. The intermediate system refers to the Baltic Sea. The mathematical analysis, based on first order kinetics for the exchange of matter in a system according to compartment principles, also includes products in decay chains, i.e. daughter nuclides generated by decay of nuclides under ecological cycling. The time dependent exposures have been studied for certain long-lived nuclides of radiological interest in waste from reprossessed fuel. Dose and dose commitment have been calculted for different release patterns comprising idealised episodes for outflow to the biosphere during short periods and outflow governed by constant leakage from a source on the border between geosphere and biosphere. (Atomindex citation 10:431021)

NUREG/CR-1276 PC **A15**/MF **A01**
Oak Ridge National Lab., TN.
User's Manual for LADTAP II - A Computer Program for Calculating Radiation Exposure to Man from Routine Release of Nuclear Reactor Liquid Effluents,
D. B. Simpson, and B. L. McGill. May 80, 329p
ORNL/NUREG/TDMC-1

LADTAP II, a revision of the original LADTAP, implements the radiological exposure models of Regulatory Guide 1.109 appropriate for determining the radiation dose to man from the pathways in the aquatic environment - potable water, aquatic foods, shoreline deposits, swimming, boating, and irrigated foods. Doses for both the maximum individual and the general population are calculated as a function of age group and pathway for appropriate body organs. It also implements the models of WASH-1258 for calculation of doses to certain species of biota other than man.

ORNL/TM-6980 PC **A10**/MF **A01**
Oak Ridge National Lab., TN.
User's Manual to the ICRP Code: A Series of Computer Programs to Perform Dosimetric Calculations for the ICRP Committee 2 Report.
S. B. Watson, and M. R. Ford. Feb 80, 214p
Contract W-7405-ENG-26

A computer code has been developed that implements the recommendations of ICRP Committee 2 for computing limits for occupational exposure of radionuclides. The purpose of this report is to describe the various modules of the computer code and to present a description of the methods and criteria used to compute the tables published in the Committee 2 report. The computer code contains three modules of which: (1) one computes specific effective energy; (2) one calculates cumulated activity; and (3) one computes dose and the series of ICRP tables. The description of the first two modules emphasizes the new ICRP Committee 2 recommendations in computing specific effective energy and cumulated activity. For the third module, the complex criteria are discussed for calculating the tables of committed dose equivalent, weighted committed dose equivalents, annual limit of intake, and derived air concentration. (ERA citation 05:016797)

ORNL/TM-7155 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Fifth Personnel Dosimetry Intercomparison Study.
C. S. Sims. Feb 80, 76p
Contract W-7405-ENG-26

The fifth Personnel Dosimetry Intercomparison Study (PDIS) was conducted at the Oak Ridge National Laboratory's (ORNL) Dosimetry Applications Research (DOSAR) facility on March 20-22, 1979. This study is the latest PDIS in the continuing series started at the DOSAR facility in 1974. The PDIS is a three day study, typically in March, where personnel dosimeters are mailed to the DOSAR facility, exposed to a range of low-level neutron radiation doses (1 to 15 mSv or equivalently, 100 to 1500 mrem) and neutron-to-gamma ratios (1:1-10:1) using the Health Physics Research Reactor (HPRR) as the radiation source, and returned to the participants for evaluation. This report is a summary and analysis of the results reported by the various participants. The participants are able to intercompare their results with those of others who made dose measurements under identical experimental conditions. (ERA citation 05:017142)

PB80-190788 PC **A05**/MF **A01**
Bureau of Radiological Health, Rockville, MD.
Administration of the Radiation Control for Health and Safety Act of 1968, Public Law 90-602, April 1, 1980.
Annual rept. 1 Jan-31 Dec 79.
1 Apr 80, 86p FDA/BRH-80/55
See also Annual Report dated 1 Apr 79, PB80-112253.

The Secretary of HEW is required by Subpart 3, Part F of Title III of the PHS Act; 42 USC 263 et seq. (P.L. 90-602) to submit an annual report to the President for transmittal to the Congress on or before April 1 on the administration of the Radiation Control for Health and Safety Act. The detailed information required to be included in the report is outlined in Section 360D of the PHS Act. The FDA, through its Bureau of Radiological Health has been delegated the authority for the day-to-day administration of the Act. This report covers the detailed operation of the Agency in carrying out that responsibility for calendar year 1979.

RISO-R-398 PC **A14**/MF **A01**
Risoe National Lab., Roskilde (Denmark).

Radiation-Induced Sprout and Growth Inhibition in Vegetables with Special Reference to the Susceptibility to Microbial Attacks and the Effect of Calcium.
Thesis (Dr.Agr.),
J. P. Skou. Mar 79, 305p
U.S. Sales Only.

Experiments have shown ionizing irradiation to be an effective method for sprout and growth inhibition but it is necessary to keep the doses at the absolute minimum in order to avoid unwanted by-effects One of the by-effects is an increased susceptibility to storage rot in potatoes, onions and carrots. This effect is connected with the wounding and bruising caused by digging up and handling as the wound healing process is inhibited simultaneously with the sprout inhibition. Patogens increase tissue permeability during pathogenesis and, as irradiation has an analogous effect on tissues it might facilitate the growth of the pathogens. Irradiation softens the tissue and mobilizes the calcium in the tissue; this may thereby make the tissue more accessible to microbial attack. An external supply of calcium increases the firmness of tissue, reduces tissue permeability, and may compensate for the loss of calcium in irradiated tissue mainly as a result of a surplus of calcium in the wounds. Botrytis cinerea and Sclerotinia sclerotiorum were some of the most wide spread and serious pathogens in carrots, which vegetable were the main object of the studies. Culture filtrates of these fungi had a strong macerating activity on carrot tisseues. The effect, which results from activity and interaction of pectolytic enzymes and oxalic acid, could be reduced or nullified by calcium. A diversity of the groups of pectolytic enzymes are widely distributed among organisms and not confined to plant pathogens. Because of this, because there exists pectolytic enzymes for every condition and pectic substances, and because calcium is not very inhibiting to all kinds of pectolytic enzymes it is not to be expected that the protective effect of calcium will always be expressed to the same extent on storage of the products. (Atomindex citation 10:479989)

SGAE-2870 PC **A02**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Production of Mutants of Candida Utilis with Increased Resistence Against Furfural.
G. Stehlik, M. Baron, K. Turanitz, and F. Schneider. Jan 78, 17p BL-215/78
In German.
U.S. Sales Only.

By repeated gamma -irradiation treatments and following selections a mutant of Candida utilis weissenbachii was isolated showing increased resistance against furfural as compared to its wild type. Growing and radiation survival behavior of these yeasts are compared. Analysis of furfural was done by gas chromatography on Porapak Q. (Atomindex citation 09:414621)

SGAE-3034 PC **A02**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Influence of Cycloheximide on the Radiation Sensitivity of Fungi.
E. Zechmeister, K. Turanitz, G. Stehlik, H. Altmann, and J. Meyrath. Mar 79, 6p BL-267/79
In German.
U.S. Sales Only.

The radiation sensibility of different fungi was determined and the influence of cycloheximide on radioresistance was tested. The radiation sensitive Byssochlamys fulva and Penicillium terrestre were treated with cycloheximide before gamma -irradiation, but no sensitization could be found. The radioresistent Pullularia pullulans, however, pretreated with 20 mu g/ml cycloheximide, showed an increase of the radiation effect; this effect was much lower the organisms were treater after gamma -irradiation. (Atomindex citation 10:479969)

SGAE-3037 MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Autoradiographic Technique for the Detection of DNASE-Patterns.
L. Hoffer, and N. Thumb. Apr 79, 6p BL-271/79
U.S. Sales Only. Microfiche copies only.

A discelectrophoretic method for detection of multiple forms of DNases is described. After electrophoretic separation on gels containing exp 32 p-labeled DNA the distribution of DNases is demonstrated by means of autoradiography. Any artifacts caused by discontinous slicing procedures or staining are avoided because of the possibility of continous scanning of the autoradiograms. (Atomindex citation 10:479750)

STUDSVIK-K2-78/21 MF **A01**
Aktiebolaget Atomenergi, Studsvik (Sweden).
Tranformation Factors for Doses in Connection with Internal Doses Obtained Via Inhalation or Via Eating of Different Articles of Food.
A. Appelgren, and K. A. Edvardsson. Sep 78, 58p
In Swedish.
U.S. Sales Only. Microfiche copies only.

The report describes a method for the calculation of transformation factors for internal doses. These factors will be used to calculate radiation doses in connection with internal contamination. The radioactivity is assumed to enter the body either via the inhalation of radioactive air or via the eating of contaminated articles of food. Tables of calculated transformation factors for internal doses are given. (Atomindex citation 10:480187)

6S. Stress Physiology

AD-A083 700/5 PC **A03**/MF **A01**
Air Force Aerospace Medical Research Lab Wright-Patterson AFB OH
Acceleration and Performance Modeling Workshop, Washington, DC, 14-17 May 79,
Ensor Rodriguez-Lopez, James H. Veghte, and Patricia M. Lewandowski. Dec 79, 38p Rept no. AMRL-TR-79-111
Contract F33615-78-C-0501

A workshop, sponsored by the Aerospace Medical Research Laboratory, was held to exchange current knowledge in the area of acceleration and performance modeling and to provide future guidance. Representatives from the Air Force, US Navy Medical Research Laboratories as well as distinguished academicians participated in this workshop. Two current modeling approaches were presented and provided the basis of later discussions. The participants responses to this effort in this area were favorable and future topics for another meeting were discussed. (Author)

AD-A083 849/0 PC **A02**/MF **A01**
School of Aerospace Medicine Brooks AFB TX
Regional Coronary Blood Flow at Rest and during High Sustained +G sub z in a Miniature Swine with Subclinical, Ischemic, Coronary Heart Disease due to Coronary Stenosis.
Final rept. 1976-1977,
M. Harold Laughlin, W. M. Witt, John W. Burns, and John T. Young. 1978, 8p Rept no. SAM-TR-78-280
Pub. in Aviation, Space, and Environmental Medicine, v49 n11 p1308-1313 19 Nov 78. Original contains color plates: All DTIC/NTIS reproductions will be in black and white.

No abstract available.

AD-A083 850/8 PC **A02**/MF **A01**
School of Aerospace Medicine Brooks AFB TX
Regional Cerebral Blood Flow in Conscious Miniature Swine during High Sustained +G sub z Acceleration Stress.
Interim rept. Jul 77-Dec 78,
M. Harold Laughlin, W. M. Witt, and R. N. Whittaker. 1979, 6p Rept no. SAM-TR-79-308
Pub. in Aviation, Space, and Environmental Medicine, v50 n11 p1129-1133 1979.

No abstract available.

AD-A083 882/1 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Use of Oxygen for Optimizing Decompression.
Medical research progress rept.,
T. E. Berghage, and T. M. McCracken. Nov 78, 12p Rept no. NMRI-79-0110
Pub. in Undersea Biomedical Research, v6 n3 p231-239 1979.

No abstract available.

AD-A084 057/9 Not available NTIS
Flying Personnel Research Committee London (England)
Intravascular Volume and Tonicity as Factors in the Regulation of Body Temperature,
M. H. Harrison, R. J. Edwards, and P. A. Fennessy. 27 Apr 77, 10p Rept no. FPRC/1363
Availability: Pub. in Jnl. of Applied Physiology, v44 n1 p69-75 1978 (No copies furnished by DTIC/NTIS).

No abstract available.

N80-22955/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effects of Audio-Visual Stimulation on the Incidence of Restraint Ulcers on the Wistar Rat.
M. S. Martin, F. Martin, and R. Lambert. Dec 79, 7p NASA-TM-75950
Contract NASW-3199
Transl. Into English from Compt. Rend. Soc. Biol., V. 164, No. 8/9, 1970 p 1748-1750. Original Document Announced as N80-19748. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

The role of sensory simulation in restrained rats was investigated. Both mixed audio-visual and pure sound stimuli, ineffective in themselves, were found to cause a significant increase in the incidence of restraint ulcers in the Wistar Rat.

N80-22956/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Role of Adrenals in the Mobilization of Carbohydrate and Fat Resources after Overstimulation of Rats.
G. G. Khechninashvili. Jan 80, 13p NASA-TM-75974
Contract NASW-3198
Transl. Into English from Farmakol. Toksikol. (USSR), V. 35, No. 5, 1972 p 575-580. Transl. By Scientific Translation Service, Santa Barbara, Calif. Original DOC. Prep. By USSR Acad. Of Med. Sci., Leningrad.

The role of the cortical and cerebral layers of the adrenal glands in mobilizing carbohydrate and fatty resources in response to the effect of an extreme stimulant was investigated. It is shown that following adrenodemedullation and adrenalectomy, the leading role is played by the secretion of the adrenal medullary layer, whereas the role of suprarenals in the mobilization of fats is only slightly pronounced.

N80-22957/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
State of the Mitral Valve in Rabbits with Hypokinesia.
V. Y. Strelkovska. Dec 79, 7p NASA-TM-76003
Contract NASW-3199
Transl. Into English from Dopov. Akad. Nauk Ukr. Rsr, Ser. Geol., Khim. Biol. Nauki, V. 36, No. 1, 1974 p 72-75. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

In hypokinesia, edema of all the layers of the mitral value was observed, which resulted in morphological changes of the cellular and noncellular components. An increase in ratio of elastic and collagenic fibers in the value was also observed along with and changes in their structural and staining properties. The observed changes can limit valve mobility and can result in manifestations of cardiac valve insufficiency, which is found clinically.

N80-22958/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Animal Experimental Research on Microstructural Behavior on the Hyaline Arthroidal Cartilage after Immobilization and Remobilization.
H. J. Refior. 3 Feb 80, 6p NASA-TM-76050
Contract NASW-3199
Transl. Into English from Langenbecks Archmany fuer Chirugie (Germany, F.R.), 1976 p 296-298.

Transl. By Kanner (Leo) Associates, Redwood City, Calif.

The degeneration of the articular cartilage after a period of immobilization was investigated. The experiment was carried out by the immobilization of the knee joints of rabbits. Even after remobilization there was an increase in the alterations. These changes did not prove to be reversible.

N80-22959/4 PC A02/MF A01
National Aeronautics and Space Administration, Washington, DC.
Incorporation of Glycine-2-C-14 in Acid-Insoluble Proteins of Rat Bones and Teeth During Hypokinesia and Administration of Thyrocalcitonine.
A. I. Volozhin, L. I. Stekolnikov, N. N. Uglova, and V. Y. Potkin. Dec 79, 8p NASA-TM-75981
Contract NASW-3198
Transl. Into English from Farmakol. Toksikol. (USSR), V. 37, No. 2, 1974, p 223-226. Original Language Document Was Announced as A72-40432. Transl. By Scientific Translation Service, Santa Barbara, Calif.

A forced limitation of the motor activity in rats (from 5 to 60 days) results in reduced incorporation of glycine 2-C14 in the total acid insoluble proteins of limb bones and its increase in the teeth and mandibular-maxillary bones. Daily administration of five micrograms of thyrocalcitonine together with polyvinylpyrrolidone normalizes the protein metabolism in the bone tissues during the 40 days of experimentation.

N80-22960/2 PC A02/MF A01
National Aeronautics and Space Administration, Washington, DC.
The Ulcerogenic Effect of Bile and Bile Acid in Rats During Immobilization Stress.
J. Weisener. Feb 80, 14p NASA-TM-76054
Contract NASW-3199
Transl. Into English from Z. Gastroenterol. (Germany, F.R.), V. 12, No. 7, 1974 p 539-546. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

The effect of different concentrations of oxen bile and individual bile acids or their sodium salts on the gastric mucosa of rats was investigated in combination with immobilization stress. A statistically significant higher frequency of ulcers was only determined in the application of 10% oxen bile. Dosages on 10% sodium glycocholic acid demonstrated strong toxic damage with atonic dilation of the stomach and extensive mucosal bleeding.

N80-22961/0 PC A02/MF A01
National Aeronautics and Space Administration, Washington, DC.
Effect of Prolonged Hypodynamia on Certain Physiological Functions in Dogs.
B. R. Yaremenko. Dec 79, 8p NASA-TM-75979
Contract NASW-3198
Transl. Into English from Patol. Fiziol. Eksp. Ter. (USSR), V. 14, No. 6, Nov. - Dec. 1970 p 10-13. Translation Was Announced as N74-19752. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The behavior of 20 dogs whose mobility was restricted was experimentally investigated. Their reactions to hypodynamia were either active behavior or progressive general depression and increased muscular weakness. Arterial pressure, pressor sinocarotid reflex valve, body weight, pulse rate, body temperature, and plasma cholinesterase activity were monitered for 28 days. Results are reported.

N80-22962/8 PC A02/MF A01
National Aeronautics and Space Administration, Washington, DC.
The Effect of Restraining on the Heart Rate in Guinea Pigs.
H. Mikiskova. Jan 80, 12p NASA-TM-76006
Contract NASW-3198
Transl. Into English from Activ. Nerv Super/ (Czech.), V. 10, No. 4, 1968 p 382-388. Transl. By Scientific Translation Service, Santa Barbara, Calif.

The emotional effect of different applications of electrodes and the fixation for cariographic examination was investigated using guinea pigs. The effect of the stress is discussed in terms of heart rhythm and behavior.

N80-22967/7 PC A02/MF A01
National Aeronautics and Space Administration, Washington, DC.
Reactivity of Organism in Prolonged Space Flights.
P. V. Vasilyev. Jan 80, 14p NASA-TM-75975
Transl. Into English from Astronaut. Acta (Austria), V. 17, 1972 p 107-112. Transl. By Scientific Translation Service Santa Barbara, Calif.

An analysis of published data are presented as well as the results of experiments which show that the state of weightlessness and hypodynamia result in a reduced orthostatic and vestibular resistance, increased sensitivity to infections, decreased endurance of accelerations and physical exercises, and altered reactivity of the organism to drugs. Various consequences of weightlessness on the human body, especially weightlessness combined with other factors linked to long space flights are also considered.

N80-22968/5 PC A02/MF A01
National Aeronautics and Space Administration, Washington, DC.
Dynamics of Change of Lipid and Monoamine Metabolisms and the Blood Coagulation System During Experimental Atherosclerosis Caused by Restriction of Movement.
G. S. Gvishiani, and N. G. Kobakhidze. Apr 80, 5p NASA-TM-76033
Contract NASW-3199
Transl. Into English from Soobshch. Akad. Nauk. Gruz. Ssr (USSR), V. 60, No. 2, 1970 p 445-447. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Georgian SSR Acad. Of Sci., Tbilisi, USSR.

Shifts in lipid, catecholamine, and blood coagulation systems following various periods (1, 2, 3, and 4 months) of experimentally induced atherosclerosis were studied. The same indices were studied in the tissues of the myocardium, liver, and brain stem-reticular formation after decapitation of the animals at the end of the experiment. Periodic motion restriction caused an increase in blood beta-lipoproteins in the rabbits at the beginning of the experiment. An increase in general cholesterol content and a decrease in the lecithincholesterol index were established at the end of the experiment. Myocardial beta-lipoprotein and brain stem reticular formation general cholesterol contents were elevated; catecholamine content was increased at the end of the experiment. In the initial months, free adrenaline basically increased, while in later months blood adrenaline decreased and blood noradrenaline increased.

N80-22969/3 PC A02/MF A01
National Aeronautics and Space Administration, Washington, DC.
State of the Body in Disorders of Diurnal Physiological Rhythms and Long-Term Hypokinesia.
S. N. Razin, and A. V. Rychko. Mar 80, 7p NASA-TM-76051
Contract NASW-3199
Transl. Into English from Vrach. Delo, No. 5, 1976 p 104-106. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

In order to study the effects of hypokinesia and circadian rhythm restructuring on the morphological and functional status of the hypothalamo-hypophysic-adrenal system, young male Wistar rats were placed in small cages for varying periods. The animals were decapitated and preparations were made from sections of the brain and adrenals and numerous destructive changes were noted in the investigated regions of the brain, indicating that the condition of these areas is directly affected by disruption of established rhythms in physiological processes.

N80-22970/1 PC A02/MF A01
National Aeronautics and Space Administration, Washington, DC.
Catecholamines of the Adrenal Medula and Their Morphological Changes During Adaptation to Repeated Immobilization Stress.
R. Kvetnansky, A. Mitro, L. Mikulaj, and G. Hocman. Mar 80, 14p NASA-TM-76068
Contract NASW-3199
Transl. into English from Bratislav. Lek. Listy. (Czechoslovakia), V. 46, No. 1, Jan. 1966 p 35-41. Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Changes of the adrenal medulla of rats were studied in the course of adaptation to repeated immobilization stress. An increase in the number of cells in the adrenal medulla was found in the adapted animals; this increase was confirmed by weight indices of the medulla and by cell counts per surface unit. Simultaneous karyometric measurements of the nuclei of adrenal medulla cells and an analysis of the catecholamine contents in the adrenals explain the increased activity of the adrenal medulla in the course of adaptation.

N80-22974/3 PC A03/MF A01
Research Inst. of National Defence, Stockholm (Sweden).
Performance in Tasks Differing in Memory Load and Its Relationship with Habitual Activity Phase and Body Temperature.
J. E. Froeberg. Apr 79, 28p FOA-C-52002-H6

Twenty-four hour patterns in tasks differing in memory load were studied during a 75 hour vigil. Differences in performance were also studied between morning and evening active subjects, and between body temperature and performance rhythms. The task with a high memory load showed a 24 hr rhythm which was in inverse phase with the less memory loaded task and with body temperature. This was true only for the first 24 hr cycle, after that the memory loaded task tended to follow the other two variables, except in the case of the most extreme morning types for whom the inverse relationship continued to exist.

N80-22976/8 PC A02/MF A01
Flying Personnel Research Committee, London (England).
Cockpit Thermal Stress and Aircrew Thermal Strain During Routine Jaguar Operations.
T. M. Gibson, L. A. Cochrane, M. H. Harrison, and P. W. Rigden. Mar 79, 22p FPRC/REPT-1376, BR70502

Thermal data were obtained using Jaguar aircraft flying routine, warm weather operations in Sardinia. The data were analyzed in terms of the ambient and cockpit wet bulb, globe temperatures (WBGT), and the mean body temperature (Tb) of the pilot. Relationships described by equations of negative slope, were obtained between Tb and sortie time and between cockpit WBGT and sortie time. MODEL WAS developed for predicting aircrew thermal strain in the Jaguar from cockpit temperature and sortie time.

N80-22977/6 PC A06/MF A01
Research Inst. for Environmental Hygiene, TNO, Delft (Netherlands). Sound, Light and Indoor Climate Div.
Noise Effects. Effects of Noise Exposure on Blood Circulation and Respiration of Man. Part 1: Results of a Two-Hour Noise Exposure on Groups of Younger and Older People.
A. J. M. Roevekamp, and W. Passchier-vermeer. Jun 78, 123p IG-TNO-B-373-E

The influence of noise exposure on blood circulation and respiration was studied. The effects of such noise on the following parameters were examined: heartbeat frequency; absolute impedance plethysmogram: the total alternating current resistance of an extremity (arm, finger); relative impedance plethysmogram: the amplitude of that part of the alternating current resistance of an extremity, which varies with the heartbeat frequency; diastolic and systolic blood pressure and pulse pressure; and respiratory frequency. The results are compared to the effects caused by exposure to traffic noise and by exposure to a constant high sound level.

PB80-810989 PC N01/MF N01
National Technical Information Service, Springfield, VA.
Cold Weather Stress on Humans. 1964-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-May 80,
Elizabeth A. Harrison. Jun 80, 158p

Supersedes NTIS/PS-79/0589 and NTIS/PS-78/0540.

The selected abstracts cover cold stress, cold tolerance, cold injuries, acclimatization, protective clothing, and cold water exposure as related to cold weather stress on humans. (This updated bibliography contains 145 abstracts, 5 of which are new entries to the previous edition.)

6T. Toxicology

AD-A083 642/9 PC **A02**/MF **A01**
Brown Univ Providence RI
Carcinogenic Potential of Cholesterol Oxidation Products.
Final rept. 1 Feb 77-31 Jan 80,
Elizabeth H. Leduc. 15 Apr 80, 7p ARO-14362.1-L
Grant DAAG29-77-G-0073

In a pilot experiment we found striking indication that the inclusion in the diet of a dehydrated egg and milk powder, which is produced for human consumption, induced a high incidence of liver tumors in mice. We postulated that the carcinogen(s) might be oxidation products of cholesterol. Subsequent pilot experiments revealed an increase in the incidence of liver tumors after brief inclusion in the diet of 1.0% 5,6-epoxide of cholesterol, but not after prolonged inclusion of 0.1% 3,5,6-trihydroxycholesterol. (Author)

AD-A083 661/9 PC **A02**/MF **A01**
Army Environmental Hygiene Agency Aberdeen Proving Ground MD
Toxicological Assessment of ABATE (Trade Name) (O,O,O',O'-Tetramethyl-O,O'-Thio-di-p-phenylene Phosphorothioate) Dermal Penetration of Radio-Labeled ABATE, September 1977 - October 1979. Phase I,
Hubert L. Snodgrass, Jr. 23 Apr 80, 17p Rept no. USAEHA-75-51-1302-80

The dermal penetration of radio-labeled 14C-ABATE was measured in rats, rabbits, and dogs. Absorption was assessed by monitoring excreted radioactivity in urine and feces for 7 days and analysis of representative tissue specimens at the end of the test period. It is concluded that topically applied ABATE should not present a dermatotoxic hazard to man following a single application and absorption would be expected to be less than 3 percent of the applied dose. No evidence of bodily retention or pooling of the radioactive moiety has been demonstrated in these tests. (Author)

AD-A083 929/0 PC **A03**/MF **A01**
California Univ Irvine
The Mammalian Toxicity of Fluomine Dust.
Interim rept.,
E. R. Kinkead, H. F. Leahy, M. G. Schneider, Jr., C. C. Haun, and R. S. Bowers. Mar 80, 33p AMRL-TR-80-15
Contract F33615-76-C-5005

Acute chronic toxic effects of fluomine on animals were evaluated to establish recommendations for health and safety standards. Fluomine, also known as cobalt-bis(3-fluorosalicylaldehyde)-ethylenediimine, is an alternate oxygen storage source at high altitudes. Fluomine was shown to be an eye and skin irritant and a potent dermal sensitizing agent. Chronic inhalation exposure to 0.5 mg/cu m produced pulmonary changes in dogs and rats while no significant irritation was noted at an exposure concentration of 0.1 mg/cu m. (Author)

AD-A083 952/2 PC **A02**/MF **A01**
Defence Research Establishment Suffield Ralston (Alberta)
Convulsions and Organophosphate Poisoning: Significance of Changes in Levels of Blood Gases, Glucose and Insulin.
Technical paper,
John G. Clement, and Mary Jane Lee. Apr 80, 14p Rept no. DRES-TP-496

The significance of changes in blood glucose, insulin and gases in soman-induced convulsions in rats was investigated. It was found that neither hypoglycemia nor hypoxia was a contributing factor in the soman-induced convulsions. (Author)

AD-A084 023/1 PC **A02**/MF **A01**
Air Force Aerospace Medical Research Lab Wright-Patterson AFB OH
Effects of Hydrazine on Pregnant ICR Mice.
Technical rept.,
Robert D. Lyng, William C. Keller, and Kenneth C. Back. Mar 80, 12p Rept no. AFAMRL-TR-80-19

As more women enter jobs formerly held by men there is a risk that exposure to some chemicals may cause birth defects in an unborn child. The objective of this project was to determine the usefulness of ICR Mice as a test species. Hydrazine was injected intraperitoneally on days 6, 7, 8, and 9 of gestation at concentrations to 4, 12, 20, 30, and 40 mg/kg body weight. Physiological saline was administered in the same manner to a control group. Hydrazine in concentrations up to 20 mg/kg body weight had no significant effect on the number of implantations per female, the mean number of viable fetuses per litter, or the mean number of resorptions per litter. At concentrations of 30 and 40 mg/kg, hydrazine was fetotoxic and 4 of 21 females died at a concentration of 40 mg/kg. As the dose was increased from 4 to 30 mg/kg there was an increasing percentage of litters with soft tissue anomalies with exencephaly and hydronephrosis produced most often. Skeletal abnormalities were produced at a higher frequency and at lower concentrations than soft tissue abnormalities. Supernumerary ribs accounted for most of these defects. Pregnant mice receiving 12 and 20 mg/kg showed a lower rate of weight gain during the injection period than those receiving saline or 4 mg/kg. After the injection period, from days 9 through 11, the mice receiving 12 and 20 mg/kg had the highest rate of gain.

IAEA-R-1518-F MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Metabolism and Toxicity of Polonium 210 and SiO sub 2 . Final Report, for the Period 15 July 1974-14 July 1977.
D. Panov. Feb 78, 21p
U.S. Sales Only. Microfiche copies only.

Synergistic effects of quartz dust and of Po-210 have been investigated in lungs and kidneys of rats. The substances (50mg silicone per animal, 5 (or 10) mu Ci of Po-210 per kg bodyweight) were introduced intratracheally in a single dose. Exposure times were 7 and 12 month. Postmortem the following quantities were determined: weight of lung and kidneys, Po-210 content, hydroxyproline contents of the lungs. Autoradiographic and histopathological investigations were carried out. It was found that synergistic effects increase mortality. The most frequent cause of death was renal lesions. Po-210 behaves as a nephrotoxic agent, causing damages to all kidney structures, it mainly attacks the epithelium of convoluted renal tubules of nephrons. The cancerogenic effects of Po-210 are enhanced in the presence of quartz. Po-210 predominantly accumulates in the kidney cortex. Po content of lungs and kidneys was still high after 7 month. Po-retention was highest in kidneys not subjected to quartz, in lungs the opposite effect was observed. Hydroxyproline contents are moderately increased in Po-contaminated lungs. (Atomindex citation 10:423428)

PB80-115223 PC **A08**/MF **A01**
National Inst. for Occupational Safety and Health, Rockville, MD. Office of Extramural Coordination and Special Projects.
National Institute for Occupational Safety and Health (NIOSH) Current Intelligence Bulletin Reprints - Bulletins 19 thru 30 for 1978,
Leonard J. Bahlman. Sep 79, 156p DHEW/PUB/NIOSH-79-146

In January 1975, the National Institute for Occupational Safety and Health (NIOSH) developed a Current Intelligence System. Through this system, persons concerned with occupational health are informed of health and safety hazards that have gone unrecognized or are greater hazards than generally known. Since the inception of the NIOSH Current Intelligence System, over 30 Current Intelligence Bulletins have been issues as part of the information dissemination process. The 1978 Bulletins have been reprinted in this publication. It is important to note that the Bulletins have been reprinted essentially as originally published and do not contain information that may have become available since the date of the publication. Also, for some of the substances, NIOSH may have since issued Criteria Documents with recommended occupational health standards. Contents: 2,4-Diaminoanisole in hair and fur dyes; Tetrachloroethylene (Perchloroethylene); Trimellitic anhydride (TMA); Ethylene thiourea (ETU); Ethylene dibromide and disulfiram toxic interaction; Direct black 38, direct blue 6, and direct brown 95 benzidine derived dyes; Ethylene dichloride (1,2-dichloroethane); NIAX catalyst ESN; Chloroethanes - review of toxicity; Vinyl halides - carcinogenicity; Glycidyl ethers; and Epichlorohydrin.

PB80-176415 PC **A04**/MF **A01**
SRI International, Menlo Park, CA.
Extent of Exposure Survey of Benzyl Chloride.
Technical rept.,
Joel M. Cohen, Philip Diamond, and Paul M. Giever. Feb 78, 56p DHEW/PUB/NIOSH-78-160
Contract PHS-210-76-0158

The National Institute for Occupational Safety and Health (NIOSH), under PL 91-596 is responsible for criteria development and epidemiological research of occupational exposures to toxic materials or harmful physical agents. Thus, NIOSH has sponsored SRI International to investigate occupational exposure to benzyl chloride. A suitable worker population could not be located for use in a retrospective mortality study, so a limited, cross-sectional extent of exposure survey was conducted to document the current exposure pattern of benzyl-chloride production and use.

PB80-177041 PC **A02**/MF **A01**
Environmental Research Lab., Gulf Breeze, FL.
Effect of Diflubenzuron on an Estuarine Crustacean.
Final rept.,
D. R. Nimmo, T. L. Hamaker, J. C. Moore, and C. A. Sommers. 1979, 6p EPA-600/J-79-059, CONTRIB-379
Pub. in Bull. Environm. Contam. Toxicol., v22 p767-770, 1979.

Data are reported for tests exposing a small, estuarine crustacean, Mysidopsis bahia, to diflubenzuron (Dimilin, TH-6040, (1-(4-chlorophenyl)-3-(2,6-difluorobenzoyl)urea)) in flowing seawater. Tests were conducted in intermittent flows from a diluter or continuous flowing water in which the toxicant was added by an infusion pump. Diflubenzuron was acutely and chronically toxic to M. bahia: the calculated 96-hr LC50 was 2.1 micrograms/l (95% fiducial limits, 1.6 to 2.7 micrograms/l at 24 to 25C and 23 to 29 parts per thousand salinity. In a life-cycle experiment, the 21-day LC50 was 1.24 microgr 3/l (95% fiducial limits, 0.84 to 1.8 micrograms/l at 24 to 26C and 23 to 29 parts per thousand salinity). In the life-cycle studies, the reproductive success (number of young produced per female) was found to be a more sensitive criterion of effect than survival of adults. For example, only 13.5 young/female were produced in an estimated concentration of 0.075 micrograms/l whereas 21.4 and 21.0 young/female were produced in controls. As diflubenzuron concentrations increased, there was direct suppression of reproduction.

PB80-177603 PC **A10**/MF **A01**
H2M Corp., Farmingdale, NY.
Effects of Pathogenic and Toxic Materials Transported via Cooling Device Drift - Volume 1. Technical Report.
Final rept. Jan 77-Sep 79,
H. D. Freudenthal, J. E. Rubenstein, and A. Uzzo. Nov 79, 218p EPA-600/7-79-251A
Contract EPA-68-02-2625
See also Volume 2, PB80-177611.

The report describes a mathematical model that predicts the percent of the population affected by a pathogen or toxic substance emitted in a cooling tower plume, and gives specific applications of the model. Eighty-five pathogens (or diseases) are cataloged as potentially occurring in U.S. waters, but there is insufficient data to predict the probability of occurrence or relate their occurrence to public health, population, or pollution. Sixty-five toxic substances are cataloged as potentially occurring in U.S. waters, but the actual number is probably

many times the EPA-supplied list. Toxic concentrations to persons, animals, and plants are known for only a few of the chemicals: most toxic levels can be only inferred from animal studies. In the population as a whole, the epidemiological impact of a pathogen is a function of age, sex distribution, racial (genetic) distribution, general health and well-being, prior exposure, and immunological deficiency states. While cooling device drift may not be directly responsible for epidemics, it may potentiate the burden in an already weakened population, raising a segment of the population into the clinical state. The effect of toxic substances is difficult to evaluate because of inadequate data on humans. The effect is a function of concentration in susceptible tissue, and is much less dependent than pathogens on host resistance.

PB80-177611 PC **A16**/MF **A01**
H2M Corp., Farmingdale, NY.
Effects of Pathogenic and Toxic Materials Transported via Cooling Device Drift. Volume 2. Appendices.
Final rept. Jan 77-Sep 79,
H. E. Freudenthal, J. E. Rubenstein, and A. Uzzo.
Nov 79, 359p EPA-600/7-79-251B
Contract EPA-68-02-2625
See also Volume 1, PB80-177603.

The report describes a mathematical model that predicts the percent of the population affected by a pathogen or toxic substance emitted in a cooling tower plume, and gives specific applications of the model. Eighty-five pathogens (or diseases) are cataloged as potentially occurring in U.S. waters, but there is insufficient data to predict the probability of occurrence or relate their occurrence to public health, population, or pollution. Sixty-five toxic substances are cataloged as potentially occurring in U.S. waters, but the actual number is probably many times the EPA-supplied list. Toxic concentrations to persons, animals, and plants are known for only a few of the chemicals: most toxic levels can be only inferred from animal studies. In the population as a whole, the epidemiological impact of a pathogen is a function of age, sex distribution, racial (genetic) distribution, general health and well-being, prior exposure, and immunological deficiency states. While cooling device drift may not be directly responsible for epidemics, it may potentiate the burden in an already weakened population, raising a segment of the population into the clinical state. The effect of toxic substances is difficult to evaluate because of inadequate data on humans. The effect is a function of concentration in susceptible tissue, and is much less dependent than pathogens on host resistance.

PB80-177728 PC **A04**/MF **A01**
Agricultural Research and Education Center, Lake Alfred, FL.
Worker Reentry in Florida Citrus Pesticides in the Agricultural Environment,
H. N. Nigg. Feb 80, 66p EPA-600/1-80-013
Grant EPA-R-804633

The environmental behavior of five organophospate insecticides in Florida citrus are reported. Parathion disappearance rate from fruit, leaf, and soil surfaces was the same. Potential worker exposure to parathion was leaf surface, soil surface, fruit surface, and a minor component in air. Disappearance of parathion surface residues was accurately represented with a first-order solar radiation, rainfall, temperature, and dew model. Dialifor, malathion, oxydemetonmethyl, and dioxathion fruit and leaf surface residues exhibited different disappearance rates. The disappearance rate, however, was the same on fruit and leaf surfaces for individual compounds. Based on rates of disappearance uner different environmental conditions, environmental sensitivity was oxydemetonmethyl malathion dioxathion dialifor. These data suggest that fruit data could be eliminated from worker safety reentry registration requirements for organophosphate insecticides. Two surface residue techniques were compared. Vacuum and dislodgeable residue techniques differed in the amount of particulate matter and pesticide residue recovered. Vacuum, dislodgeable and air particulate numbers and sizes were relatively comparable. The dislodgeable residue technique for worker reentry data appeared superior to the vacuum technique.

PB80-177736 PC **A02**/MF **A01**
Environmental Research Lab., Gulf Breeze, FL.
Diazinon (Trade Name): Chronic Toxicity to, and Brain Acetylcholinesterase Inhibition in, the Sheepshead Minnow, 'Cyprinodon variegatus'.
Final rept.,
Larry R. Goodman, David J. Hansen, David L. Coppage, James C. Moore, and Edward Matthews. 1979, 13p EPA-600/J-79-071, CONTRIB-374
Pub. in Transactions of American Fisheries Society, v108 p479-488, 1979.

The toxicity of Diazinon to sheepshead minnows is described. Although the number of eggs spawned by continuously exposed fish was significantly reduced (alpha =0.05) in all concentrations, no concentration tested significantly affected parental survival or fertility of eggs, nor were survival and growth of progeny affected in a subsequent 28-day test. Fish exposed to 0.47 micrograms/liter spawned 22.6 eggs/female-day, or 69% of control production (32.8 eggs/female-day). The number of eggs spawned by fish exposed to 6.5, 3.5, 1.8, and 0.98 micrograms/liter Diazinon was similar (14.9-17.9 eggs/female-day), averaging 45-55% of production by control fish. Egg production by fish that had been previously exposed to 3.5 micrograms/liter did not change significantly following depuration for 23 to 31 days. AChE activity varied inversely with exposure concentration, fish in the highest concentration (6.5 micrograms/liter) averaging 71% inhibition. The concentration of Diazinon measured in adult fish exposed to 1.8, 3.5, and 6.5 micrograms/liter averaged 169 times the concentration measured in the water. Diazinon was not consistently detected (<0.05 mg/kg) in fish exposed to 0.98 and 0.47 micrograms/liter. The maximum acceptable toxicant concentration (MATC) for sheepshead minnows continuously exposed to Diazinon, based on reduced fecundity, is <0.47 micrograms/liter; the application factor (MATC divided by 96-hour median lethal concentration) is <0.0003.

PB80-177744 PC **A05**/MF **A01**
Environmental Research Lab.-Duluth, MN.
Effects of Pollution on Freshwater Fish,
R. L. Spehar, G. W. Holcombe, R. W. Carlson, R. A. Drummond, and J. D. Yount. 1979, 79p EPA-600/J-79-073
Pub. in Jnl. Water Pollut. Control Fed., v51 n6 p1616-1694 Jun 79. See also report dated Jun 78, PB-284 761.

An extensive review of 478 references on the effects of pollution on freshwater fish for 1977-1978 is presented. These references cover: Reviews and Symposia, Dissolved Gases, pH, Insecticides, Herbicides, Piscicides and Anesthetics, Inorganics and Organic Chemicals, Chlorine and Sewage, Pulp and Paper, Radioactivity and Physical Factors.

PB80-177751 PC **A02**/MF **A01**
Environmental Research Lab., Gulf Breeze, FL.
Vertebral Dysplasia in Young Fish Exposed to the Herbicide Trifluralin.
Final rept.,
J.A. Couch, J. T. Winstead, D. J. Hansen, and L. R. Goodman. 1979, 11p EPA-600/J-79-072, CONTRIB-346
Pub. in Jnl. of Fish Diseases, v2 p35-42, 1979. Prepared in cooperation with University of Southern Mississippi, Hattiesburg. Dept. of Biology.

Sheepshead minnows, Cyprinodon variegatus Lacepede, exposed to 5-5 to 31 micrograms/l of the herbicide trifluralin, throughout their first 28 days of life, developed a heretofore, undescribed vertebral dysplasia. This dysplasia consisted of semisymmetrical hypertrophy of vertebrae (three to 20 times normal), characterized by foci of osteoblast and fibroblasts actively laying down bone and bone precursors. Effects of the abnormal vertebral development were dorsal vertebral growth into the neural canal, ventral compression of renal ducts, and longitudinal fusion of vertebrae. Fish, exposed for 51 days to 16-6 micrograms/l trifluralin and thereafter depurated for 41 days, showed no increase in vertebral dysplasia during depuration; however, residual spinal column damage was evident. Serum calcium concentrations were elevated in adult fish exposed for 4 days to 16-6 micrograms/l trifluralin. Fluorosis or mimicry of hypervitaminosis A are considered possible mechanisms for the osseous effect, but are not considered to be the only possible causes. The highly predictable nature of this disorder in experimental exposures strengthens the probability that young fish may serve as experimental models for determining effects of chemicals on early vertebrate ontogeny, particularly in regard to skeletal development.

PB80-177801 PC **A03**/MF **A01**
Environmental Research Lab., Athens, GA.
Fate of Toxic Organic Substances in the Aquatic Environment.
Journal article,
Ray R. Lassiter, George L. Baughman, and Lawrence A. Burns. 1978, 31p EPA-600/J-78-164
Pub. in Journal of State-of-the-Art in Ecological Modelling v7 p219-246 1978.

Models that predict the environmental fate of toxic chemicals can be used as guides for data acquisition for currently used chemicals and as tools for calculating expected environmental concentrations or new chemicals introduced into commerce. These models are based on a set of mathematical descriptions of rate processes of chemical transformations and equilibria, both written as functions of environmental factors. To test the model, it must be used to make predictions that can be observed experimentally. For the tests, experimental environmental environments should be employed that can be controlled to provide conditions for which the predictions were made. Applications of the models requires that a file of environmental descriptions be available. Several applications have been made.

PB80-177827 PC **A02**/MF **A01**
Environmental Research Lab., Gulf Breeze, FL.
Kepone: Toxicity and Bioaccumulation in Blue Crabs.
Journal article (Final),
Steven C. Schimmel, James M. Patrick, Jr., Linda F. Faas, Jerry L. Oglesby, and Alfred J. Wilson, Jr. 1979, 9p EPA-600/J-79-057, CONTRIB-349
Pub. in Journal of Estuaries v2 n1 p9-15 Mar 79.

Two long-term studies were conducted to determine toxicity, uptake and duration of Kepone in blue crabs (Callinectes sapidus). In the first, Kepone was administered to crabs in seawater 0.03 or 0.3 micrograms Kepone/l or food (eastern oyster, Crassostrea virginica, containing 0.25 micrograms/g Kepone). Uptake of Kepone in 28 days was primarily through the contaminated oysters. When these crabs were held in Kepone-free seawater and fed Kepone-free oysters for 28 days, no loss of the insecticide was evident. There were adverse effects on molting and survival in crabs fed oysters that contained 0.25 micrograms/g Kepone. A second study was conducted to determine: (1) the depuration of Kepone over a 90-day period in blue crabs fed oysters from the James River, Virginia (containing 0.15 micrograms/g Kepone; and (2) the effects of Kepone on molting and survival of blue crabs fed James River oysters or laboratory-contaminated oysters that contained 0/15 or 1.9 micrograms/g Kepone. Crabs fed Kepone-contaminated oysters followed by a diet of Kepone-free oysters for 90 days had detectable concentrations of the insecticide in tissues. Also, blue crabs that ate oysters containing Kepone in concentrations similar to those found in oysters from the James River, died or molted less frequently than crabs fed Kepone-free oyster meats.

PB80-177835 PC **A02**/MF **A01**
Environmental Research Lab., Gulf Breeze, FL.
Effects of Sevin on Development of Experimental Estuarine Communities.
Journal article (Final),
M. E. Tagatz, J. M. Ivey, H. K. Lehmann, and J. L. Oglesby. 1979, 11p EPA-600/J-79-060
Pub. in Journal of Toxicology and Environmental Health 5 p643-651 1979. Prepared in cooperation with West Florida Univ., Pensacola.

The composition of animal communities developing from planktonic larvae in aquariums containing sand and flowing estuarine water was altered in the presence of the carbamate insecticide Sevin (carbaryl). Treatments were control and concentrations of Sevin that averaged 1.1, 11.1, and 103 micrograms/l; each treatment was replicated 8 times. Animals that colonized aquarium sand were

collected in a 1-mm mesh sieve after 10 wk of exposure. Mollusks, arthropods, annelids, and nemerteans were the numerically dominant phyla. The average number of species per aquarium was significantly less in aquariums containing 11.1 or 103 micrograms/l than in those containing 1.1 micrgrms or in control aquariums. The abundant clam Ensis minor grew significantly less in length at the higher concentrations of Sevin. The amphipod Corophium acherusicum was particularly affected; significantly fewer were found at all concentrations than in the control aquariums. A marked increase in the abundance of the annelid Polydora ligni in aquariums containing 103 micrograms/l corresponded to a marked decrease in the number of other annelids and to a significant absence of nemerteans.

PB80-177843 PC **A02**/MF **A01**
Environmental Research Lab., Gulf Breeze, FL.
Use of the Grass Shrimp 'Palaemonetes pugio' in a Life-Cycle Toxicity Test.
Journal article (Final),
Dana Beth Tyler-Schroeder. 1979, 14p EPA-600/J-79-061
Pub. in Journal of Aquatic Toxicology, ASTM STP 667 p159-170 1979.

A methodology for using the estuarine grass shrimp (Palaemonetes pugio) in life-cycle toxicity tests was successfully developed. Life-cycle exposures of juvenile shrimp (12 to 19 mm in rostrum-telson length) to the chlorinated hydrocarbon pesticide endrin were begun in November 1976 and completed in March 1977. After the juveniles matured and spawned, the effects on their progeny were determined. Tests were conducted in a flow-through seawater system, using a modified Mount and Brungs diluter. The average measured exposure concentrations were 0 (control), 0.03, 0.05, 0.11, 0.18, 0.38, and 0.79 micrograms endrin/litre seawater. The juveniles reached sexual maturity during the first two weeks of the exposure. Thereafter, a photoperiod regime was used to induce reproduction, and the effects of endrin on the survival, growth, and reproduction of the parent generation were determined. Larvae spawned by control and exposed parents were continuously exposed until the juvenile stage (7 to 20 m in rostrum-telson length). The effects on survival, length of larval development, and growth of the F1 generation were determined.

PB80-177868 PC **A02**/MF **A01**
Environmental Monitoring Systems Lab., Las Vegas, NV.
Selected Toxicological Studies of Dimilin in Weanling Male Rats.
Final rept.,
Yogendra M. Patel, and John A. Santolucito. Feb 80, 18p EPA-600/3-80-031

The effects of the subacute doses of Dimilin (1(4-chlorophenyl)-3-(2,6-difluoropbenzyl)urea) on the reproductive system of weanling male rats were examined over a period of 96 days. The parameters evaluated were: plasma testosterone level, growth of reproductive organs (testes, prostate, seminal vesicles) and adrenal glands, and histological examination of tissues for pathological changes associated with the administration of Dimilin. The animals, 25 days old, were given 0, 15, 150, and 300 milligrams/kilogram/day of Dimilin suspension in vegetable oil by intragastric intubation for a period of 0, 14, 28, 42, and 96 days. The data indicate that Dimilin had no adverse effects on body weight or organ weights of weanling rats, but a decrease in circulating testosterone in the plasma of animals of prepubertal age was noted. However, this effect of Dimilin began to disappear with the onset of puberty. The histological examination of the test animals with lower circulating testerone in plasma failed to reveal any Dimilin-induced changes in interstitial or germinal cells. On the basis of these observations, it is concluded that Dimilin, at 15, 150, and 300 mg/kg/day dosage levels, transiently depresses the testosterone in plasma in the prepubertal period, yet has no delaying effects on the development of the reproductive organs.

PB80-177934 PC **A18**/MF **A01**
Battelle Columbus Toxicology Program Office, Vienna, VA.
Preclinical Toxicologic Evaluation of Aziridinyl Benzoquinone (NSC-182,986) in Dogs, Monkeys and Mice.
Final rept. 1 May-22 Nov 78,
M. P. Hacker, C. B. Hong, M. J. McKee, S. J. Unwin, and M. A. Urbanek. 15 Dec 78, 423p
Contract N01-CM-4-3746
Prepared by Midwest Research Inst., Kansas City, MO. Pharmaceutical Toxicology Section, Report no. MRIKC-PT-3899-78-16.

Aziridinyl benzoquinone (NSC-182,986) was compatible with canine plasma and serum, but caused hemolysis until it was diluted to a 1:16 concentration. The vehicle alone also caused hemolysis until it was diluted to a 1:8 concentration. The intravenous LD50 study in CDF1 mice revealed no sex related differences in response to AZQ. The LD50 for males was 11.4 mg/kg and for females 11.1 mg/kg. AZQ caused significant toxicity to lymphoid tissue, bone marrow and intestinal tract of dogs and monkeys when administered at the TDH or greater, regardless of dose regimen. Lymphoid toxicity was expressed as lymphoid depletion. Bone marrow toxicity was demonstrated by hematologic changes (leukopenia, reticulocytopenia, thrombocytopenia, decreased hematocrit, hemoglobin and erythrocytes) and by hypocellularity of the bone marrow. Clinical signs (anorexia, emesis, diarrhea, blood and mucous in the feces and weight loss) and histopathologic lesions (degeneration and depletion of the crypt epithelium) characterized AZQ-induced intestinal changes. Other, less consistent, sites of AZQ toxicity included the liver (increased serum enzyme levels and centrilobular congestion) and the kidney (elevated BUN and creatinine levels and tubule dilation). AZQ was less toxic in monkeys than dogs when compared on the per cu m basis. AZQ was equitoxic in dogs whether given as a single i.v. dose or five daily i.v. doses, when the total dose given is compared. AZQ appears to be more toxic, however, when given on an intermittent basis of five daily i.v. doses followed by 9 days, repeated three times or if given as a single i.v. dose on a weekly basis.

PB80-179328 PC **A07**/MF **A01**
Oak Ridge National Lab., TN.
Toxicity of Leachates.
Final rept.,
J. L. Epler, F. W. Larimer, T. K. Rao, E. M. Burnett, and W. H. Griest. Mar 80, 144p EPA-600/2-80-057

The report represents a multidisciplinary effort to establish a data base for evaluation of the toxicity of extracts from solid wastes representative of various industries. Seventeen solid wastes and an arsenic-contaminated groundwater were studied. The solid waste samples were subjected to the extraction procedure proposed in the Federal Register on December 18, 1978 (43 FR 58956), and the resulting extracts were characterized. Analytical chemical methodologies were evaluated to determine their suitability for the use in analysis of the waste extracts, and procedures were established for preparing organic concentrates from the extracts. Screening assays for toxicity to aquatic organisms and terrestrial plants were evaluated for use in characterization of waste extracts. Short term in vitro mutagenicity bioassays were evaluated and applied to testing the waste extracts.

PB80-179336 PC **A06**/MF **A01**
Institute of Meteorology and Water Management, Warsaw (Poland). Dept. of Water Chemistry and Biology.
Investigations of Biodegradability and Toxicity of Organic Compounds.
Final rept. 1975-79,
Jan R. Dojlido. Dec 79, 118p EPA-600/2-79-163
Grant EPA-PR-05-532-15

The development of elaborate industrial societies has led to proliferation of a vast number of complex chemicals for industrial, agricultural and domestic use. Some portion of these compounds eventually find their way into municipal and industrial wastewater. Unless specifically removed by waste treatment processes, they ultimately appear in receiving waters and water supplies, thus no longer is it sufficient to remove biochemical oxygen demand to protect the oxygen resource of the receiving water but individual organic compounds become a concern. Knowledge of the toxicity and biodegradability of organic compounds will aid in designing wastewater treatment processes and be useful in elaborating the criteria for safe concentrations of organics in wastewaters discharged to surface waters. This report describes the testing of twelve compounds both for biodegradability and toxicity. The compounds tested were: methylethyl ketone, dimethyl amine, dimethyl foramide, p-nitrophenol, o-chlorophenol, trichlorophenol, 2,2'dichlorodiethyl ether and five fluorescent whitening agents used as components of household detergents. The biodegradation tests performed were respirometric measurements, river model and activated sludge model. Additionally, for some compounds supplementary tests were made for evaluation of their volatility, photolysis and adsorption on activated sludge. The toxicity was measured with use of fish Lebistes reticulatus and crustacean Daphnia magna.

PB80-180458 PC **A02**/MF **A01**
Minnesota Univ.-Duluth. Dept. of Chemistry.
Relationships of Activities of Metal-Ligand Species to Aquatic Toxicity,
V. R. Magnuson, D. K. Harriss, M. S. Sun, D. K. Taylor, and G. E. Glass. 16 Nov 78, 24p EPA-600/J-79-077
Grant EPA-R-804996
Pub. in Chemical Modeling in Aqueous Systems, American Chemical Society Symposium Series No. 93 p635-656.

Water quality criteria for toxicity of metal-ligand species to aquatic life are investigated by computer modeling. The speciation calculations are performed using REDEQL2. Correlations of toxicity to concentrations (or activities) of particular species or types of species are discussed with respect to three laboratory studies on zinc and copper.

PB80-180482 PC **A99**/MF **A01**
Battelle Columbus Labs., OH.
Potentially Toxic and Hazardous Substances in the Industrial Organic Chemicals and Organic Dyes and Pigments Industries
Final rept. 20 Jan-20 Jun 79,
R. A. Markle, A. F. Fentiman, T. R. Steadman, and R. A. Mayer. Mar 80, 715p EPA-600/2-80-056
Contract EPA-68-02-1323

The objective of this program were identification of the potential hazards associated with the production and use of industrial organic chemicals (IOC) and organic dyes and pigments (ODP) and determination of the state of the art of the control and treatment of potentially hazardous waste generated during manufacture and use of these materials. The major study outputs are comprehensive master tables of 510 IOC, 142 ODP raw materials, 722 ODP intermediates and 1458 dyes and pigments containing correlated compounds identification, toxicity data, chemical production process information. Eight 'priority rating' lists containing chemicals ranked in order of quantitative toxicity or production data and twelve 'priority' lists with chemicals presented alphabetically were extracted from the master tables. Although about 150 compounds are thus shown to pose potential toxic hazards, the toxicity data were found to vary widely in both availability, and in precision where available in replicate. Consequently these simplistically prepared lists must be used with caution. Pollution control and waste treatment technologies applicable to these industries are discussed and summarized, but 'best' technologies for specific compounds/processes are not specified.

PB80-181175 PC **A03**/MF **A01**
Midwest Research Inst., Kansas City, MO.
Teratology of a Zineb Formulation,
Robert D. Short, Jan L. Minor, Timothy M. Unger, Bradley Breeden, and Dan VanGoethem. Feb 80, 28p EPA-600/1-80-017
Contract EPA-68-02-2982

The purpose of the present study was to evaluate the teratogenic potential of a zineb formulation. An initial toxicity study indicated that oral doses of 1,000 or 2,000 mg/kg/day adversely affected the weight gain of nonpregnant rats but not nonpregnant mice. In the teratology study pregnant rats and mice received daily oral doses of 0, 200, 632, or 2,000 mg/kg from day 6 of gestation until the day before C-section. Maternal welfare, as moni-

tored by body weight and food consumption, was affected only in rats that received 2,000 mg/kg/day of the formulation. Evidence of embryo or fetal lethality was not present in rats or mice. However, fetuses from rats that received 2,000 mg/kg/day of the formulation had a reduced body weight. Some anomalies were significantly increased in rats that received 2,000 mg/kg/day of the formulation. These anomalies included hydrocephalus, split centra, incompletely ossified frontal bones, and enlarged occipital fontanel. None of the anomalies observed in mice were increased to a statistically significant level in any of the groups treated with the formulation. This study indicated that the zineb formulation produced anomalies in rats at doses which adversely affected maternal welfare. In addition, there was no evidence of teratogenicity in mice treated with similar doses.

PB80-181282 PC **A05**/MF **A01**
Illinois Univ. at the Medical Center, Chicago. School of Public Health.
Health Effects of Ozone and Other Photochemical Oxidants in the Chicago Area.
Final rept.,
William Hallenbeck, William Kojola, Robert Allen, Peter Scheff, and James Melius. Sep 79, 93p
INR-79/27
Errata sheet inserted.

The objectives of this report were: (1) to examine pertinent literature for its relevance in assessing the human health effects of exposure to ozone and other photochemical oxidants in the Chicago metropolitan area (2) to determine the feasibility of conducting a study of the health effects of ozone and other oxidants in the Chicago area (3) to develop the general methodology for conducting a study of the health effects of exposure to ozone and other photochemical oxidants in the Chicago area, and (4) to determine if photochemical oxidants other than ozone are present in the Chicago area. It was concluded that the existing literature is insufficiently complete to allow the assessment of the human health effects of exposure to ozone and other photochemical oxidants in the Chicago area. Therefore, the feasibility of conducting a study of the health effects of exposure to photochemical oxidants in the Chicago area was explored. It was concluded that there are areas in Chicago which experience quite different levels of ozone and that it is feasible to carry out a health effects study in the Chicago area.

PB80-181761 PC **A05**/MF **A01**
Illinois Univ. at Urbana-Champaign. Water Resources Center.
A Routine Water Monitoring Test for Mutagenic Compounds,
James B. Johnston, and James N. Herron. May 79, 99p UILU-WRC-79-0141, W80-04937

The development of a simple, relatively comprehensive method for the recovery of nonvolatile mutagenic compounds from surface waters is described. The method recovers compounds by sequential passage of the water sample through a silica gel bed, then a cation-exchange bed, and then an anion-exchange bed--all contained in a single multi-bed column of glass and teflon, the parfait column. Nonvolatile compounds not adsorbed to any of these beds were recovered following concentration of the column effluent by vacuum distillation at < 30 degrees. The beds of the parfait column were separated and eluted independently. Using the Ames Salmonella/microsome reversion assay, each residue was assayed for mutagenic activity. The method was evaluated by recovery of five known mutagens, benzo(a)pyrene, 4-nitroquinoline-1-oxide, ethidium bromide, nitrofurylfuramide, and solium azide, each initially spiked into a sample of laboratory deionized water and an environmental water sample to a final concentration of less than 3ppb. The method has been used to survey ten Illinois surface waters for naturally occurring mutagenic activity. The parfait/distillation method differs from other techniques for the recovery of waterborne mutagens in its emphasis on the recovery of nonvolatile compounds and neutral water-soluble compounds. This method has also detected a significant mutagenic activity in samples as small as 2 gallons of water, a volume consumed by a normal person every few days.

PB80-183288 PC **A13**/MF **A01**
Oak Ridge National Lab., TN.
Chemicals Identified in Human Biological Media, A Data Base. Volume 1, Part 1. October 1979.
Annual rept. no. 1, Sep 78-Sep 79,
M. Virginia Cone, Margaret F. Baldauf, Fay M. Martin, and John T. Ensminger. Mar 80, 289p
ORNL/EIS-163-VOL-1-PT-1, EPA-560/13-79-011-VOL-1-PT-1
Contract W-7405-eng-26
See also Volume 1, Part 2, PB80-183296.

A comprehensive data base of chemicals identified in human biological media (tissues and body fluids) has been established under the direction of the Environmental Protection Agency's Office of Toxic Substances Survey and Analysis Division. This centralized resource of body-burden information was inspired by the concern of government scientists over continuing reports of toxic chemicals in human tissues and body fluids. Body burden is a reflection of exposures to food, air, and water contaminants, as well as pharmaceuticals. The systematic acquisition of body-burden data will facilitate a more relevant assessment of human exposure to toxic chemicals and xenobiotics than previously possible using environmental contamination levels. Data were obtained primarily from the open literature through manual searches of selected journals. Retrospective searching to 1974 is complete and has yielded over 2000 pertinent documents of which approximately 400 have been entered into the data base as of this report. These sources identify over 200 chemicals which have been found in human biological media.

PB80-183296 PC **A99**/MF **A01**
Oak Ridge National Lab., TN.
Chemicals Identified in Human Biological Media, A Data Base. Volume 1, Part 2. October 1979.
Annual rept. no. 1, Sep 78-Sep 79,
M. Virginia Cone, Margaret F. Baldauf, Fay M. Martin, and John T. Ensminger. Mar 80, 815p
ORNL/EIS-163-VOL-1-PT-2, EPA-560/13-79-011-VOL-1-PT-2
Contract W-7405-eng-26
See also Volume 1, Part 1, PB80-183288.

Contents:
- User's guide;
- Abbreviations for analytical methods;
- References for data base;
- References for physical and chemical data;
- Appendix A. Journals searched;
- Appendix B. Chemicals in data base;
- Appendix C. Cross-referenced chemical lists;
- Appendix D. Tissues and body fluids in data base.

PB80-811045 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Biological Effects of Mercury Pollution. 1964-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-May 80,
Robena J. Brown. Jun 80, 267p
Supersedes NTIS/PS-79/0577 and NTIS/PS-78/0496.

The selected abstracts cover mercury toxicity, poisoning, absorption, excretion, bioaccumulation, and concentration levels in various plants, animals, microorganisms, and humans. Topics also include toxic hazards, occupational safety and health, microbial degradation and environmental health. (This updated bibliography contains 256 abstracts, 18 of which are new entries to the previous edition.)

7. CHEMISTRY

7A. Chemical Engineering

AD-A083 793/0 PC **A06**/MF **A01**
Army Armament Research and Development Command Dover NJ Large Caliber Weapon Systems Lab
Alternative Processes for HMX Manufacture.
Technical rept.,
Victor I. Siele, Maurice Warman, John Leccacorvi, Richard Hutchinson, and Rocco Motto. Oct 79, 119p ARLCD-TR-78008, AD-E400 362

Three new procedures were developed for preparing HMX from hexamine, one involving TAT as the intermediate; the others, DADN and DANNO. The DADN process was studied in some detail; the other two were not developed beyond the exploratory stage. Overall yield (hexamine to HMX) in the DADN process is about 13% higher than that of the conventional Bachmann process, and the acetic anhydride requirement is considerably lower. The first two steps were demonstrated in continuous pilot plant operation, yielding about 14 lb/hour of DADN in simple equipment. Application of the inert carrier concept (ICP) did not show promise. A cost study indicated that the DADN process offered no advantage over the Bachmann, mainly because two additional acids (sulfuric and polyphosphoric) are used. (Author)

AD-A083 916/7 PC **A03**/MF **A01**
Naval Research Lab Washington DC
Technical, Energetics, and Economic Comparison of NRL Oxidative Coal Liquefaction Process with some Developed Coal Liquefaction Processes.
Memorandum rept.,
R. N. Hazlett, and J. Solash. 5 Mar 80, 27p Rept no. NRL-MR-4176

An oxidative process for the liquefaction of coal is being studied at NRL. This process offers the technical advantage of using a very common reactant, air, compared to the currently favored reductive processes (H-Coal, SRC, and EDS) which require hydrogen as the reactant. The NRL process has the additional engineering advantage of operating at much lower pressures and somewhat lower temperatures than the reductive processes. The product from the NRL process is expected to have a heating value similar to that from the SRC process. (Author)

DOE/ET/14803-T3 PC **A03**/MF **A01**
Amoco Oil Co., Naperville, IL. Research and Development Dept.
Coal Liquefaction Catalyst Development. Quarterly Progress Report No. 2, July 1-September 30, 1979.
D. K. Kim, R. J. Pellet, K. K. Robinson, and J. A. Mahoney. Oct 79, 39p
Contract AC01-79ET14803

The thermal and catalytic baseline runs continued with HDS-1442A as the reference catalyst and toluene soluble conversion as the basis for liquefaction performance. Results from these experiments suggested that a 30-minute run time should be selected for screening experiments. No promising candidates for testing in the continuous aging unit were identified. Catalyst Aging Tests: Eastern Coal was centered around evaluation of the new SRC II slurry oil as a liquefaction solvent as well as a design change in the catalyst basket for the continuous aging unit. Uncertainties in Run 5188 clouded the assessment of the slurry oil effect. Subsequent runs with the new SRC II solvent indicated that slurry oil effects are small. Catalyst Aging Tests: Western Coal concentrated on ascertaining the liquefaction behavior of a Western Coal such as Wyodak with AMOCAT type catalysts. Simplifications were made in the composition of our synthetic coal feed to improve analytical and kinetic accuracy. Using SRC II heavy distillate as the slurry oil and Illinois No. 6 coal feed, the results from the aging test are quite clear. The recently prepared 500 pound batch of AMOCAT 1A is good quality and exhibits highly improved performance over the H-Coal catalyst, HDS-1442A. Benzene and hexane soluble conversion are markedly higher with hexane soluble conversion declining less rapidly with time. The highly improved catalyst should be considered for future evaluation in the larger H-Coal process development unit. (ERA citation 05:014679)

FE-1517-81 PC **A05**/MF **A01**
Fluor Engineers and Constructors, Inc., Irvine, CA.
Coal Liquefaction Test Center. Quarterly Technical Progress Report, January-March 1979.
Jul 79, 94p
Contract EX-76-C-01-1517

Various products were processed for rehydrogenation in Section 600. The run, which logged a total of 532 hours of continuous operation, started with second-stage hydrogenation of extract and fol-

lowed with multiple hydrogenation of heavy fuel oil product. The J-A608D hydrogen reactor recycle pump achieved a total of 1006 hours of service. Also the J-A900A fresh hydrogen compressor operated continuously for 447 hours. These combined performances demonstrated a significant improvement in the operational capability of Section 600. On February 13 a fire caused by solvent leaking from a valve bonnet damaged thermocouples and electrical wiring on the B-A201 slurry preheater. This incident delayed startup efforts on the front-end of the plant for subsequent runs. 5000 gallons of heavy fuel oil product were successfully test-burned in a small industrial-type boiler. In addition, a 50-50 mixture of process-derived naphtha and No. 2 fuel oil were routinely burned in the plant boilers. There were three periods of integrated operation; two lasted about 18 hours and one about 28 hours. The PTI-54 plasma-sprayed coating has shown good performance in a low temperature service in the J-A803A/B char slurry pumps. Erosion resistance in that service was substantially better than Tribaloy 800. PTI-54 also gave better service in J-A806 tar quench pump service than Hardalloy 32. In J-A313A primary feed pump service a martensitic white iron impeller showed good erosion resistance but TMT-5 boride hard facing does not appear to be satisfactory. (ERA citation 05:014683)

FE-2030-TR15 PC **A04**/MF **A01**
Pennsylvania State Univ., University Park. Coal Research Section.
Specifications and Design of a Pressurized Laminar-Flow Isothermal Reactor for Studies of Coal Reactivity.
H. E. Shull, and R. E. Essenhigh. Jun 79, 68p
Contract EX-76-C-01-2030

One facet of the larger project entitled The Characteristics of American Coals in Relation to Their Conversion to Clean Energy Fuels is intended to develop and test a series of reactor vessels capable of providing quantitative data on coal performance in reactions important in the gasification of coal, and to generate quantitative data on the pyrolysis behavior and reactivities of representative coal lithotypes and chars derived therefrom. A most important task element of this facet is the design, construction and testing of a pressurized isothermal reactor capable of operating at temperatures up to 1300 exp 0 C and at pressures up to 100 atmospheres. Required is an experimental system that will best permit rapid heating, isothermal reaction, rapid quenching of the sample reaction, variation of reaction time, study of pyrolysis or reaction with ambient gases, pressurization, and unambiguous reaction history. Attainment of these characteristics is the objective of the facet element described herein. The system is designed to feed coal dust at a pre-set rate into a controlled high temperature and pressure reactor, in the presence of hydrogen or other reactive gas, and then separate the solid effluent from the gas. (ERA citation 05:014646)

FE-2307-58 PC **A02**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Research and Development of Rapid Hydrogenation for Coal Conversion to Synthetic Motor Fuels: Riser Cracking of Coal. Project 61001 Quarterly Report, July 1-September 30, 1979.
D. A. Duncan, J. L. Beeson, and R. D. Oberle. Dec 79, 23p
Contract EX-76-C-01-2307

The main effort was directed toward the shakedown runs in the PDU. A number of equipment problems surfaced which have been, or are being, corrected. The combustion system has been operated successfully, and some short runs have been made in which both liquids and gases have been produced. Longer runs at hydrogen-to-coal ratios of 0.2 to 0.3 will be made during the forthcoming quarter. From work done in the bench-scale unit it has been found that a large fraction of steam in the carrier gas significantly alters the distribution of carbon among products. Carbon oxide yields are increased and hydrocarbon liquid yields are decreased; ethane yields were essentially unchanged, and methane yields were decreased slightly. An equipment flow sheet for a commercial hydropyrolysis plant for producing fuel gases, blending gasoline constituents, and fuel oil from coal has been developed and is being used as a base case for process analysis. A number of processing options have become apparent that will require a further analysis before estimates of total plant investment and selling prices of products can be completed. (ERA citation 05:017350)

FE-2616-T2 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Coal Pump Development and Technical Support Project. Quarterly Technical Status Report, July 2-September 30, 1979.
R. Phen. 1979, 31p
Contract EF-77-A-01-2616

Work on assessing the full feeding system requirements for new gasification processes is proceeding. Performance testing of experimental feeders is also reported. Experiments on extruding coal at high temperatures and atomizing the extruded coal with warm gaseous nitrogen were demonstrated. (ERA citation 05:017337)

FE-2893-32 PC **A04**/MF **A01**
Exxon Research and Engineering Co., Florham Park, NJ.
EDS Coal Liquefaction Process Development. Phase IV. Interim Report.
W. R. Epperly. Aug 79, 63p
Contract EF-77-A-01-2893

Work was completed on revising the onsites basis for the Illinois Coal Base Case of the EDS Commercial Plant Study Design Update. Objectives of the Study Design Update include the incorporation of latest laboratory and engineering results into an updated framework of investment costs and economics, and the further identification of process and equipment areas requiring additional development. The onsites basis was revised to reflect changes resulting from the design phase. Liquefaction train size and slurry furnace bases were developed for the Illinois Study Design Update. Two liquefaction lines will be provided in each plant train, each line consisting of slurry furnace, reactor, and separators. The entire line will shut down as required for decoking of the slurry furnace, estimated to take place on a six-month cycle. With this operating plan, a spare slurry furnace is not needed. Outlines of operating procedures were prepared for startup, shutdown and unit outages, both scheduled and unscheduled. Tankage needs were identified. Based on these analyses, a preliminary product recovery factor of 80 to 85% was estimated. (ERA citation 05:014693)

FE-2893-33 PC **A05**/MF **A01**
Exxon Research and Engineering Co., Florham Park, NJ.
EDS Coal Liquefaction Process Development. Phase IV. Interim Report.
W. R. Epperly. Sep 79, 92p
Contract EF-77-A-01-2893
U.S. Sales Only.

The Illinois Coal Base Case is a maximum liquids case which utilizes steam reforming of methane, ethane, and propane for hydrogen generation. FLEXICOKING of vacuum bottoms is utilized to generate low Btu gas fuel for the plant. Later, a sensitivity case will be evaluated that will include partial oxidation of vacuum bottoms to produce hydrogen, with product sales of methane/ethane. The plant site is to be a hypothetical location in Illinois. The plant feed coal is to be Illinois No. 6 coal. Fuel oil product is to be blended to meet specifications of no more than 0.58 wt% sulfur and no more than 0.15 wt% solids (equivalent to 0.1 lb particulate/MBtu). The plant will utilize three different fuels; low Btu gas (LBG) produced in FLEXICOKING, C sub 3 LPG, and Illinois No. 6 coal. LBG is to be the main plant fuel utilized as onsite fuel and fuel to the offsite boilers. A vaporized C sub 3 LPG backup fuel system is to be provided in the steam reforming furnaces. C sub 3 LPG will be used when insufficient LBG is being produced and during startup. Besides LBG, Illinois No. 6 coal can be used in the offsite boilers to generate steam. The short-term onsite fuel system variability is to be accommodated by varying the coal firing rate in the offsite boilers. Longer-term variability in onsite fuel demands is to be accommodated by varying the operations in FLEXICOKING. The plant will utilize LBG for pilots to protect against flameout in all onsite process furnaces, except steam reforming. Pilots are not needed in steam reformers because of the multiplicity of burners. Use of LBG for pilot gas avoids the consumption of high value LPG. (ERA citation 05:014694)

ORNL/TM-6810 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Survey of Industrial Coal Conversion Equipment Capabilities: Executive Summary.
W. R. Williams. Jan 80, 96p
Contract W-7405-ENG-26

A survey of industrial coal conversion equipment capabilities was conducted to determine the present capabilities of US industry to suppply equipment for future demonstration and commercial coal conversion facilities. Equipment operating experience, prices, development needs, and market demand have also been considered. This report summarizes survey activities and covers rotating components (pumps, compressors, hydraulic turbines, and gas expanders), valves, letdown valves, heat-transfer equipment, gas-purification equipment, mechanical piping connectors, and expansion joints. A related survey on coal-handling and -preparation and ash/slag-removal equipment is also discussed. Equipment should be available for all clean-stream appplications, except perhaps oxygen compression. Rotating components handling solids (slurries or entrained solids in gas streams) must be carefully specified and for many applications will need significant upgrading. Heat-recovery equipment must be developed during the demonstration phase. Proven high-temperature, high-pressure gas purification equipment, except cyclones, is essentially nonexistent. Mechanical connectors and expansion joints are considered available for all applications. Abstracts and outlines for eight reports, which provide additional details concerning the industrial survey, are included in the Appendices. (ERA citation 05:014670)

7B. Inorganic Chemistry

AD-A083 893/8 PC **A02**/MF **A01**
Ohio State Univ Columbus
Studies on the Conversion of Pentaborane(9) to Decaborane(14).
Technical rept.,
Francis L. Himpsl, and Sheldon G. Shore. Apr 80, 24p ARO-15611.1-C
Grant DAAG29-78-G-0112

The work described in this report is concerned with the development of simple and practical procedures for the conversion of B5H9 to B10H14. Descriptions are given for all of the conversion procedures developed in this laboratory which led to the successful isolation of B10H14 in significant yields. The most promising results were obtained when BBr3 was used as a hydride abstracting agent. Yields of B10H14 in the range 40 to 48% have been obtained.

LBL-9874 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Synthesis and Characterization of Pa(IV), Np(IV), And Pu(IV) Borohydrides.
R. H. Banks, and N. M. Edelstein. Dec 79, 21p
CONF-790917-19
Contract W-7405-ENG-48
American Chemical Society national meeting, Washington, DC, USA, 10 Sep 1979.

The actinide borohydrides of Pa, Np, and Pu have been prepared and some of their physical and optical properties measured. X-ray powder diffraction photographs of Pa(BH sub 4) sub 4 have shown that it is isostructural to Th(BH sub 4) sub 4 and U(BH sub 4) sub 4 . Np(BH sub 4) sub 4 and Pu(BH sub 4) sub 4 are much more volatile than the borohydrides of Th, Pa, and U and are liquids at room temperature. Results from low-temperature single-crystal x-ray diffraction investigation of Np(BH sub 4) sub 4 show that its structure is very similar to Zr(BH sub 4) sub 4 . With the data from low-temperature infrared and Raman spectra, a normal coordinate analysis on Np(BH sub 4) sub 4 and Np(BD sub 4) sub 4 has been completed. EPR experiments on Np(BH sub 4) sub 4 /Zr(BH sub 4) sub 4 and Np(BD sub 4) sub 4 /Zr(BD sub 4) sub 4 have characterized the ground electronic state. 5 figures. (ERA citation 05:016254)

7C. Organic Chemistry

AD-A083 765/8 PC **A02**/MF **A01**
North Carolina Univ At Chapel Hill Dept of Chemistry
Synthesis and Characterization of Metallo-Organic Conducting Materials with Tetraazaannulenes.
Technical rept.,
William E. Hatfield. 15 Apr 80, 8p Rept no. TR-10
Contract N00014-76-C-0816

Compounds of the macrocyclic ligand 4,11-dihydro-dibenzo(b,i)(1,4,8,11)tetraaza(14)annulene, dB-TAA, have been prepared with Cu(2+), Ni(2+), Co(2+), Pd(2+), Pt(2+). The palladium complex crystallizes in two crystalline modifications, one of which is similar to the structurally characterized compound Ni(dB-TAA), while the second form packs as cofacial dimers in the solid state.

AD-A083 967/0 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Chemistry
Gem-Difluoroallithium: Improved Synthesis Brings Improved Applicability.
Interim technical rept.,
Dietmar Seyferth, Robert M. Simon, Dennis J. Sepelak, and Helmut A. Klein. 15 Apr 80, 10p
Rept no. TR-10
Contract N00014-76-C-0837

The action of N-butyllithium in hexane on CF2BrCH=CH2/CF2=CH-CH2Br (5:2 yield 20:1 mixture) in 5:1:1 THF/Et2O/pentane at -95 degrees C generates gem-difluoroallylilithium which may be trapped, generally in good yield, by the in situ procedure using triorganochlorosilanes (yield R3SiCF2CH=CH2) and aldehydes and ketones (yield RR'C(OH)CF2-CH=CH2). (Author)

JAERI-M-7864 PC **A08**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Studies on Radiation-Induced Graft Polymerization.
Hideki Omichi. Sep 78, 175p
In Japanese.
U.S. Sales Only.

Radiation-induced graft polymerization is used extensively to improve physical properties of polymers, but few processes are now commercialized. The reason for this is partly inadequate basic research on the reaction and partly the difficulty in developing the grafting process with large radiation source. Firstly, new techniques are proposed of studying kinetics of the graft polymerization in heterogeneous system. Based on the grafting yield, the molecular weight of graft chains, and the amount of radicals given by ESR and activation analysis, kinetic parameters are obtained and the reaction mechanism of grafting process is discussed. Secondly, the development of grafting process of poly (vinyl chloride)-butadiene is described. By study of the reaction, process design, construction and operation of the pilot plant, and economic analysis of the process, this process with exp 60 Co gamma ray sources is shown to be industrially promising. (Atomindex citation 10:481733)

JAERI-M-7949 PC **A06**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Annual Report of the Osaka Laboratory for Radiation Chemistry, Japan Atomic Energy Research Institute, (No. 11). April 1, 1977 - March 31, 1978.
Oct 78, 111p
U.S. Sales Only.

This report describes research activities of Osaka Laboratory for Radiation Chemistry, JAERI during one year period from April 1, 1977 through March 31, 1978. The latest report, for 1977, is JAERI-M 7355. Detailed descriptions of the activities are presented in the following subjects: studies on reactions of carbon monoxide and hydrogen; polymerization under the irradiation of high dose rate electron beams; modification of polymers, degradation, cross-linking, and grafting. (Atomindex citation 10:481728)

PATENT-4 195 166 Not available NTIS
Department of the Navy Washington DC
Alkanediamide-Linked Polyphthalocyanines Coordinated with SnCl2.
Patent,
James R. Griffth, and Jacques G. O'Rear. Filed 23 Oct 78, patented 25 Mar 80, 4p AD-D007 181/1, PAT-APPL-954 031
Supersedes PAT-APPL-954 031-78, AD-D005 472.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A polphthalocyanine is prepared by mixing SnCl2-2H2O with N, N-bis(3,4-dicyanophenyl)decane diamide. Heating the mixture to a temperature from about 175 C to about 185 C for about 15 to 20 minutes to form a resin; and curing the resin at a temperature from about 190 C to about 230 C, the polyphthalocyanine is prepared. It is useful as an adhesive, as a matrix for glass or carbon-fiber reinforced composites, and as structural material.

PB80-180771 PC **A03**/MF **A01**
Kansas Water Resources Research Inst., Manhattan.
Selective Removal of Nitrate and Nitrite from Polluted Waters.
Project completion rept. 1 Jul 77-30 Sep 79,
Cliff E. Meloan, and Wayne C. Danen. 1 Apr 80, 26p W80-04869, OWRT-A-079-KAN(1)
Contract DI-14-34-0001-8018

The objective of the research project was to synthesize an insoluble polymer to remove nitrate and nitrite from water. A high capacity nitrate- and nitrite-selective polymer was synthesized by attaching nitron to commercial polyvinylbenzyl chloride (60/40 ortho/para isomers). The capacity of this polymer to remove nitrate and nitrite from 10-(3)M solution was 67% and 42%, respectively. The compound 1-phenyl-2-diethylamino-ethyl-4'-aminobenzoate was also synthesized and attached to commercial polyvinylbenzyl chloride (60/40 ortho/para isomers). A polymer was synthesized by attachment of 1-(4'-nitrophenyl)-2-diethyl-aminoethyl-4'-hydroxybenzoate to polyvinylbenzyl chloride (60/40 ortho/para isomers). The capacity of this polymer to remove nitrate and nitrite from aqueous solution was 80% and 68%, respectively. All of the synthesized polymers could be easily regenerated without loss of capacity and used repeatedly providing a possibility for commercial development.

PER-41 PC **A02**/MF **A01**
Atomic Energy Board, Pelindaba, Pretoria (South Africa).
Radiation Polymerisation of Tetrafluoroethylene in Freon-12.
N. G. Schnautz, and J. C. Thompson. Jul 79, 8p
U.S. Sales Only.

The radiation-induced solution-polymerisation of tetrafluoroethylene in Freon-12 has been investigated over the temperature range of -62 degrees Celsius to -10 degrees Celsius. The rate of polymerisation for the in-source process was found to exhibit a 0,5 order dependence on the radiation intensity and an activation energy of 25,3 kJ/mole was calculated. The number-average molecular mass of the product PTFE was found to range from 2x10 exp 4 to 8x10 exp 4 , was relatively independent of the radiation intensity, and a maximum at a monomer concentration of approximately 70 mole per cent. The postpolymerisation process was found to greatly enhance the molecular mass of the product PTFE and values as high as 1,7 x 10 exp 6 were obtained at a monomer concentration of 60 mole per cent. (Atomindex citation 10:493825)

SGAE-2921 PC **A03**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Copolymers for Soft Hydrophilic Contact Lenses: Development and Investigations.
G. W. Schwach. May 78, 43p FT-20/78
In German.
U.S. Sales Only.

Low esters of methacrylic acid which may be polymerized by different methods are used predominantly for producing soft hydrophilic contact lenses. Compounds of the vinyl-type often are added to improve the optical and mechanical qualities. Composition as well as possibilities of polymerization by irradiation were tested so long until copolymers were found which finally allowed the production of soft hydrophilic contact lenses. Swelling characteristics and permeability of the different elastomeres are to be investigated in order to guarantee sufficient compatibility of contact lenses. Contamination of the lens materials by microorganisms is also a point of special interest. The effects on the hydrophilic contact lens-copolymers by different substances used for cleaning and storage solutions have been investigated as well. (Atomindex citation 10:481736)

7D. Physical Chemistry

AAEC/E-453 PC **A04**/MF **A01**
Australian Atomic Energy Commission Research Establishment, Lucas Heights.
Proton Induced X-Ray Emission (PIXE) Analysis at Lucas Heights.
D. Cohen, and P. Duerden. Feb 79, 54p
U.S. Sales Only.

The state of the proton induced X-ray emission (PIXE) work at Lucas Heights is reported together with a full description of the experimental arrangement and its use for analysis of trace elements (Z >or= 14). The fundamentals of PIXE are examined in detail with a view to understanding not only the background continuum but also the X-ray production mechanisms. Quantitative predictions for the number of X-rays detected after proton bombardment of the target have been made and these compare well with experiments. (Atomindex citation 10:481625)

AD-A083 639/5 PC **A02**/MF **A01**
Queen Mary Coll London (England) Dept of Chemistry
Kinetic Studies Involving Electronically-Excited Interhalogens and Halogens.
Final rept. 1 Jun 75-30 Nov 79,
M. A. A. Clyne. 31 Jan 80, 7p AFOSR-TR-80-0317
Grant AFOSR-75-2843

The following areas are covered: (a) kinetics of chemiluminescent reactions involving excited B states of halogens and interhalogens; (b) measurement of halogen atom concentrations; (c) studies of halogens and interhalogens by laser-induced fluorescence. Citations to 26 papers are given. (Author)

AD-A083 641/1 PC **A02**/MF **A01**
Stanford Univ CA Dept of Chemistry
Metal Combustion Processes as Studied by Chemiluminescence and Chemi-Ionization.
Final rept. 1 Jul 77-1 Feb 80,
Richard N. Zare. 11 Apr 80, 8p ARO-15219.3-C
Grant DAAG29-77-G-0151

The PbF A(omega = 1/2) -X to the 2nd power band system has been vibrationally reanalysed, based on the observation of 69 new bandheads. The singlet-triplet splitting in methylene (CH2) has been estimated to be 8.1 plus or minus 0.8 kcal/mole, based on the detection of CH2 1-A(1) following the photolysis of ketene (CH2CO). The band energies of BaI, SF6, and SF4 have been determined to be 72.9 plus or minus 2, 91.1 plus or minus 3.2, and 84.1 plus or minus 3.0 kcal/mole, based on the appearance of chemiluminescent reactions with metastable alkaline earth atoms. The two C10H8 isomers, azulene and naphthalene, have been distinguished in a mass spectrometer through the use of laser-controlled multiphoton ionization. (Author)

AD-A083 646/0 PC **A03**/MF **A01**
Johns Hopkins Univ Baltimore MD
Study of the Hydroxylammonium Nitrate - Isopropyl Ammonium Nitrate Reaction.
Final rept. 1 Apr 76-31 Dec 79,
Joyce J. Kaufman, and Walter S. Koski. 1 Apr 80, 26p ARO-13789.1-CX
Contract DAAG29-76-C-0029

When a balanced mixture of hydroxylammonium nitrate (HAN) and isopropyl ammonium nitrate (IPAN) in aqueous solution at appropriate concentrations is ignited in a high pressure bomb the reac-

tion goes to completion to produce H2O, CO2 and N2. Some intermediates of this reaction have been identified and the luminosity that is produced during the reaction has been found to be caused by sodium impurities. Since decomposition of HAN produces the oxidizers that react with the fuel (IPAN) a detailed study was carried out on the thermal decomposition of HAN.

AD-A083 675/9 Not available NTIS
Ohio State Univ Columbus Dept of Metallurgical Engineering
Interfacial Cohesion. IV. Adsorption at Grain Boundaries and Its Effect on Decohesion,
J. P. Hirth. 1980, 11p
Contract N00014-75-C-0541
Availability: Pub. in Philosophical Transactions of the Royal Society of London, Series, A, v295 p139-149 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A083 681/7 PC **A03**/MF **A01**
Rutgers - the State Univ Piscataway NJ High Pressure Materials Research Lab
Pressure Dependence of the Glass Transition and Related Properties of an Elastomer-Solithane 113.
Interim technical rept.,
D. L. Questad, K. D. Pae, B. A. Newman, and J. I. Scheinbeim. 1 Apr 80, 27p Rept no. TR-17
Contract N00014-75-C-0540

Several studies have been carried out on a polyurethane elastomer (Solithane 113). At atmospheric pressure dielectric methods were used to study epsilon(inches) over the temperature range from -180 degrees C to +20 degrees C. Three peaks in epsilon(inches) were observed: and alpha peak associated with the glass transition and two low temperature peaks (beta and lambda). Mechanical tests were performed to observe the effect of the pressure induced glass transition, Pg, on the Young's Modulus. The glass transition was stuided as a function of pressure from 1 bar to 6.5 kilobar by observing the shift of the dielectric alpha-peak with pressure and also by volumetric methods. (Author)

AD-A083 719/5 PC **A02**/MF **A01**
Rutgers - the State Univ Piscataway NJ High Pressure Materials Research Lab
Piezoelectricity in Nylon 11.
Technical rept.,
B. A. Newman, P. Chen, K. D. Pae, and J. I. Scheinbeim. 1 Apr 80, 19p Rept no. TR-19
Contract N00014-75-C-0540

At the present time, only poled, drawn poly(vinylidene fluoride) (PVF2) films give evidence of sufficiently high piezoelectric response to be useful in device applications, and for this reason the great majority of research has centered around this polymer. As in the case of PVF2, many of the odd nylons crystallize in a polar space group with a large net dipole moment in the unit cell. On the basis of the understanding now reached of the properties of poled PVF2 films it would appear that the odd nylons have the potential to make films with high piezoelectric activity. Piezoelectricity and pyroelectricity in nylon 11 films have been studied previously and piezoelectric strain coefficients found were higher than most polymers but still two orders of magnitude less than the corresponding activity found in poled oriented PVF2 (d(31) approx. 20pC/N). Studies carried out in this laboratory have shown that by appropriate variation of poling conditions and sample microstructure quite large piezoelectric constants can be obtained for nylon 11 films (d(31) approx. 3pC/N). The dependence of the piezoelectric strain constant d(31) on poling temperature, poling field and crystal structure will be discussed. (Author)

AD-A083 744/3 PC **A03**/MF **A01**
Wisconsin Univ-Madison
Island Formation and Condensation of a Chemisorbed Overlayer.
Technical rept.,
T. M. Lu, G. C. Wang, and M. G. Lagally. 14 Sep 79, 27p
Contract N00014-76-C-0727

The condensation of a chemisorbed overlayer from a lattice gas into a particular ordered structure is discussed in terms of the lattice-gas theory of Lee and Yang. The formation of islands of ordered structure is identified with the condensation phenomenon predicted by the theory. The phase diagram (transition temperature vs. coverage) based on the theory of a two-dimensional Ising ferromagnet in zero magnetic field is constructed for the condensation of a lattice gas system with net attractive interactions between the particles. It is demonstrated that critical points at coverages other than theta = 0.5 are achieved for overlayer systems with unit meshes larger than (1 x 1). Low-energy electron diffraction results of the thermal disordering (island dissolution) for oxygen chemisorbed on W(110) are compared with the theory, and the effect of substrate surface heterogeneity on the phase diagram is discussed. (Author)

AD-A083 761/7 MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Derivation of IR Optical Constants of Aerosols and Polycrystalline Surfaces (Specular Reflection by Pressed Crystal Powders).
Interim rept.,
Frederic E. Volz. 11 Apr 80, 5p Rept no. AFGL-TR-80-0118
Presented at Topical Meeting, Optical Phenomena Peculiar to Matter of Small Dimensions, Arizona Univ., Tucson. Optical Sciences Center, 18-20 Mar 80.
Availability: Microfiche copies only.

Specular reflection of infrared bands of pure, pressed crystal powders is compared with that of crystal cuts (published data) and faces of monocrystals. Samples are shown for NaCLO3, CaCO3, and NaNO2. (Author)

AD-A083 775/7 PC **A05**/MF **A01**
Tennessee Univ Knoxville Dept of Chemistry
Low Temperature Fluorination of Aerosol and Condensed Phase Sol Suspensions of Hydrocarbons Utilizing Elemental Fluorine.
Interim rept.,
James L. Adcock, and Ehrengard B. Renk. Apr 80, 78p Rept no. TR-2
Contract N00014-77-C-0685

This report outlines the development of a new method of low temperature fluorination. This method involves the reaction of gaseous elemental fuorine upon a solid-phase particulate aerosol at temperatures below room temperature. The rationale for the development of this method is that it is a flow process but preserves the low temperature, solid phase fluorination features of the low temperature gradient reactor system developed by Adcock, Marashin and Lagow while eliminating the inherent reliance on low temperature mass transport which results in long reaction times and the essentially batch nature of gradient reactor process. This report outlines in chronological fashion the systematic advances in development of Aerosol Fluorination technology. We have developed a four stage aerosol fluorination reactor which can be described as a dynamic concentration-gradient, temperature gradient reactor which achieves optimum control of the reaction between elemental fluorine and several hydrocarbon systems. Furthermore the system has shown the ability to effectively control the degree of hydrogen substitution at any level of fluorination up to and including perfluorination.

AD-A083 820/1 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Bifurcation Phenomena in Stirred Tanks and Catalytic Reactors.
Technical summary rept.,
W. H. Ray, and K. F. Jensen. Feb 80, 26p Rept no. MRC-TSR-2038
Contract DAAG29-75-C-0024

A review of the present state of understanding of continuous stirred tank reactors is presented along with certain new results on bifurcation phenomena for catalytic surfaces. A few examples are discussed which show repeated Hopf bifurcation, complex oscillations, and chaotic behaviour arising from a simple catalyst surface model. The mathematical concepts brought to bear on this problem include static and Hopf bifurcation, multiple and secondary bifurcation, and singularity theory. The features arising in the problems discussed here are thought to be common to a wide range of chemically reacting systems.

AD-A083 926/6 PC **A03**/MF **A01**
Arnold Engineering Development Center Arnold Air Force Station TN
Raman Scattering Studies of Solid-Phase Species.
Final rept. 1 Oct 77-30 Sep 79,
D. P. Weaver, and J. W. L. Lewis. Apr 80, 42p Rept no. AEDC-TR-80-4
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

The Raman spectra of cryosorbed samples of CO2, CO, N2, O2, CH4, NH3, and H2O were obtained. Cryodeposit thickness was nominally 10 to 11 micrometers, and sample temperatures were systematically varied over the range of 17 to 85 K. Spectral scans were obtained for both the lattice mode region (25 to 1/200 cm) and intramolecular vibrational mode region (200 to 2/4000 cm). Additionally, the Raman spectra of single polystyrene latex spheres.

AD-A083 943/1 PC **A06**/MF **A01**
Center for Information and Numerical Data Analysis and Synthesis West Lafayette IN
Thermophysical and Electronic Properties Information Analysis Center (TEPIAC): A Continuing Systematic Program on Data Tables of Thermophysical and Electronic Properties of Materials.
Annual rept. (Final) 1 Jan-31 Dec 79,
Cho-Yen Ho. Mar 80, 124p AMMRC-TR-80-15
Contract DLA900-79-C-1007

This Annual Final Report on Contract No. DLA900-79-C-1007 covers the activities and accomplishments of the Thermophysical and Electronic Properties Information Analysis Center (TEPIAC) for the period 1 January to 31 December 1979. TEPIAC's activities reported herein include literature search, acquisition, and input of source information; documentation review and codification; material classification; information organization; operation of a computerized bibliographic information storage and retrieval system; data extraction and compilation; data evaluation, correlation, analysis, synthesis, and generation of recommended values; preparation and publication of handbooks, data books, properties literature retrieval guides, state-of-the-art reports, critical reviews, and technology assessments; development of a computerized numerical data storage and retrieval system; technical and bibliographic inquiry services; and current awareness and promotion efforts. TEPIAC covers 14 thermophysical properties and 22 electronic, electrical, magnetic, and optical properties of nearly all materials at all temperatures and pressures and in all environments.

AD-A083 944/9 PC **A02**/MF **A01**
Washington Univ Seattle Dept of Chemistry
Gas-Surface Vibrational Energy Transfer in the Transient Region of a Low Pressure Unimolecular Reaction.
Technical rept.,
B. D. Barton, D. F. Kelley, and B. S. Rabinovitch. 31 Mar 80, 24p Rept no. TR-15
Contract N00014-75-C-0690

The Variable Encounter Method was applied to the study of the transient region in vibrational accommodation of reacting cyclopropane at surfaces. Collision efficiency declines with rise of temperature. Surface collisions are more efficient than binary gas phase encounters but declines with rise of temperature. The results agree with an independent earlier study we have made on cyclopropane-d2. (Author)

AD-A083 962/1 PC **A04**/MF **A01**
Hawaii Univ Honolulu Dept of Physics and Astronomy
Low Energy X-Ray and Electron Interactions within Matter.
Interim rept. 1 Oct 78-30 Sep 79,
Burton L. Henke. Mar 80, 65p AFOSR-TR-80-0294
Grant AFOSR-79-0027

This research program is concerned with the physics and the application of low energy x-ray and as-

sociated electron interactions. It has been concentrated upon the sub-kilovolt energy region where the need has been greatest for the development of efficient and precise spectroscopic methods, for the measurement of fundamental interaction cross sections, and for the basic theoretical modeling of certain important x-ray and electron interaction processes as, for example, x-ray induced photoemission and fluorescence. This work is applied to two areas of considerable present importance and need: the development of high efficiency spectroscopic methods that can be effectively applied to the diagnostics of high temperature plasmas--particularly as generated by high power pulsed lasers, electron or ion beams and by exploding wires, for which high temporal resolution as well as high spectral resolution is needed; and the testing and application of high-efficiency low-energy fluorescent spectroscopic measurement and analysis for valence and molecular orbital electron energy state studies, for the solid state characterization of surfaces, and for studies of the effects of radiation damage.

AD-A083 964/7 PC **A03**/MF **A01**
Cornell Univ Ithaca School of Chemical Engineering
Fundamental Studies of the Structure and Chemistry of Solid Surfaces.
Final rept.,
Robert P. Merrill. Jan 80, 27p AFOSR-TR-80-0295
Contract F49620-77-C-0118

Decomposition of hydrazine has been studied on Ir(111) from temperatures below 200k up to 1500k using a supersonic molecular beam scattering system. The decomposition begins around 200k producing nitrogen, ammonia, and hydrogen. An extremely strong angular dependence was found for nitrogen. This is the first time normally directed emission of nitrogen has been observed for surface decomposition. A Fourier transform of the entire waveform has been utilized to deduce the details of the decomposition mechanism. Photoemission from hydrazine and ammonia on Ir(111) using high intensity polarized UV radiation has been investigated. The results are consistent with the data from the scattering experiments. AES was used to monitor the absorption of oxygen on Al(111) surfaces and was found to be dependent on both time and oxygen pressure. Further studies will concentrate on the kinetics of aluminum oxidation. (Author)

AED-Conf-77-602-003 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
ESCA investigations of Ion Beam Effects on Surfaces.
S. Storp, and R. Holm. 1977, 11p CONF-7709159-4
International conference on secondary ion mass spectroscopy and ion microprobes, Muenster, F.R. Germany, 19 Sep 1977.
U.S. Sales Only.

In surface analysis ESCA is particularly suitable for qualitative and quantitative analysis, characterization of compounds, non-destructive in-depth analysis. ESCA ca therefore be used for the investigation of ion beam induced effects, such as selective sputtering, implantation of primary ions and surface atoms, changes in crystal structure, decomposition and formation of compounds. In the present paper the following questions will be discussed: 1) What happens during the bombardment of an oxide to metal interface. 2) Does a lower limit exist with respect to primary ion dose, current density, mass and energy for the production of ion beam induced effects. In both cases the possibility of, and time needed for, the reconstruction of the initial state seem to be important factors. (Atomindex citation 09:397596)

ARL-TR-006 PC **A02**/MF **A01**
Australian Radiation Lab., Melbourne.
Determination of Stannous Tin in Radiopharmaceutical Cold Kits.
A. J. Farrant. Jan 79, 11p
U.S. Sales Only.

Two methods for determining stannous tin in 'cold kits', used for the preparation of Tc-99m labelled radiopharmaceuticals, have been developed. Both are based on the direct titration of the Sn2 in solution. In the first method titration is with N-bromosuccinimide. Of the materials commonly used as cold kits only albumin has been found to interfere with the determination. The second method is a standard iodometric titration in which starch is used as indicator. None of the materials tested interfere with this procedure. The N-bromosuccinimide method is the method of choice as the reagent, a solid, can be used without prior standardization. Iodine solution must be standardized daily. The paper describes in detail the methods used and gives examples of kits in which the Sn2 levels have been determined using the described procedures. (Atomindex citation 10:481627)

BARC-1004 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Titrimetric Estimation of Uranium(VI) With Iodic Acid.
M. Venkatesan, V. Gopalakrishnan, A. Ramanujam, and M. N. Nadkarni. 1979, 7p
U.S. Sales Only.

The method uses iodic acid as titrant and has been tested for the analysis of relatively pure uranyl nitrate solutions having 4 to 20 mg uranium in sample volumes upto 2 ml with an accuracy and precision of +- 1.5%. The uranium aliquot is taken in ethanol- ethyl acetate mixture and after adjusting the pH to 2.5 the solution is titrated with standard iodic acid using pyridyl azo naphthol(PAN) as indicator. (Atomindex citation 10:493541)

BARC-1007 MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Spectrophotometric Studies on the Formation of Adducts Involved in Synergistic Extraction of Uranium (IV) By Mixtures of HTTA and Neutral Donors.
S. K. Patil, V. V. Ramakrishna, and A. Ramanujam. 1979, 22p
U.S. Sales Only. Microfiche copies only.

Adduct formation between U(TTA) sub 4 and several neutral donor (S) was investigated by utilizing the changes in the absorption spectra of U(IV) resulting from the addition of neutral donors to a solution of U(TTA) sub 4 . All the donors used in the present work from 1:1 adducts with U(TTA) sub 4 . From the spectral changes, the equilibrium constants beta sub(AB) for the adduct formation reaction viz U(TTA) sub 4 S reversible U(TTA) sub 4 .S were calculated for a few neutral donors. The log beta sub(AB) values obtained in benzene medium, are :TOPO (6.23), TBPO (6.13), TPPO (4.72), DBBP(4.04) TBP(3.04), TIOTP(1.27) and MIBK(-0.10) and a value of 3.98 for TOPO in chloroform medium. The adduct formation was found to result in increasing the coordination number of U(IV) from 8 in U(TTA) sub 4 to 9 in the adducts it forms with the neutral donors. Similar absorption spectral studies with U(DBM) sub 4 revealed that it forms much weaker adducts than the corresponding ones with U(TTA) sub 4 . The absorption spectra of the organic extracts of U(IV) from perchloric acid with mixtures of HTTA and a neutral donor were identical with the spectra of the adduct between U(TTA) sub 4 and the neutral donor. This suggested that the adduct species viz U(TTA) sub 4 .S is involved in the synergistic extraction of U(IV). The extraction constants relating to the synergistic extraction of U(IV), from aqueous perchloric acid into benzene solutions of HTTA and some of the neutral donors, were derived. (Atomindex citation 10:479108)

BARC-1008 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Ion Exchange Studies with Ferrocyanide Molybdate and Zirconium Phosphate in Mixed Solvent Media. Part 1: Synthesis of the Exchangers.
M. Ramaswamy, and N. S. Sunder Rajan. 1979, 16p
U.S. Sales Only.

The present research forms the first part of the series on the investigation of the ion exchange behaviour of ferrocyanide molybdate(FeMo) and zirconium phosphate(ZrP) in water-alcohol and water-dioxane media. Since the above exchangers are not available indigenously, they were synthesized following published methods. That the reported methods of synthesis yield products with reproducible characteristics, were checked. pH titration of these two preparations in aqueous media showed that FeMo is a stronger acid than ZrP, the former, moreover, in its Cs exp + and Na exp + forms commence dissolving at pH values close to 5 and 2 respectively, and are completely dissolved at pH values 7.5 and 2.85 respectively. Titration curves with ZrP further indicated that as the pH increases, there occurs a reversal in the order of arrangement of Na exp + and Cs exp + curves, which reversal is attributed to a corresponding reversal of selectivity. Finally, both the chemical analysis and pH titration of FeMo confirm the existence of 4 replaceable H exp + ions corresponding to H sub 4 Fe(CN) sub 6 , a constituent of ferrocyanide molybdate, while those of ZrP are consistent with the empirical formula Zr(HPO sub 4) sub 2 .4.5 H sub 2 O, having two replaceable H exp + ions. (Atomindex citation 10:493684)

BARC-1017 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Volumetric Determination of Boron in Boron Carbide.
V. K. Manchanda, and M. S. Subramanian. 1979, 6p
U.S. Sales Only.

Boron carbide is used for control rods and as a shielding material in nuclear reactors. As such, the boron carbide must conform to rigid chemical specifications. Impurities present have a significant effect on the life time of the control rods under conditions of high temperature and neutron flux. Therefore, methods for the accurate determination of the various constituents in boron carbide is of utmost importance. A volumetric procedure for the determination of boron content in boron carbide is discussed. (Atomindex citation 10:493516)

BARC-971 MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Direct Spectrographic Determination of In, La, Nb and Sr in Thorium Oxide.
R. Venkatasubramanian. 1979, 8p
U.S. Sales Only. Microfiche copies only.

A d.c. arc emission spectrographic method is described for the determination of ppm levels of In, La, Nb and Sr in thorium oxide. The method enables to determine the above low and high volatile impurity elements in thoria using AgCl as carrier in an atmosphere of oxygen. The carrier-distillation technique reported makes possible the following range of estimations: In : 1-50 ppm; 10-500 ppm and Sr 2-100 ppm. The method is simple and rapid and its precision ranges from 14% for In to 18% for Nb. Observations made on the choice of carrier and internal standard are presented. (Atomindex citation 10:478872)

BARC-976 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Mass Spectrometric Analysis of Lithium.
S. A. Chitambar, V. D. Kavimandan, S. K. Aggarwal, P. A. Ramasubramanian, and P. M. Shah. 1978, 12p
U.S. Sales Only.

The details of investigations carried out on the isotopic analysis of lithium using surface ionization mass spectrometry are presented. Various parameters affecting the precision in isotopic analysis of lithium are discussed. A precision of 1% is achieved in the relative isotope abundance measurement. (Atomindex citation 10:481623)

BARC-995 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Normal Coordinate Analysis of Borazine and Its Deuterated Derivatives - Revision in Assignments of Fundamental Modes of Vibration.
G. S. Ghodgaonkar. 1978, 15p
U.S. Sales Only.

Using the latest structural and experimental data on borazine molecule, a normal coordinate analysis of borazine has been carried out. The analysis has also been extended to partially deuterated derivatives of borazine. The calculated and experimentally observed values of vibration frequencies of borazine and its deuterated species are listed. On the basis of the calculated values, the location

of 3a sub 2 ' modes i.e. inactive frequencies has been done and assignment of frequencies has been revised. (Atomindex citation 10:481664)

CEA-CONF-4413 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Applications of Neutron Activation Analysis in Chemistry and Pollution Fields.
S. May. 1 Sep 78, 7p CONF-7809194-1
In French.Meeting of Electricians, Electronicians and Radioelectricians Societ, Orsay, France, 27 Sep 1978.
U.S. Sales Only.

Some examples of applications of activation analysis are given such as: chemical analysis of precious metals, nuclear graphite and hydrocarbons; control of pollution of water and seawater, analysis of food and seafood, atmospheric, dust and hair for determination of impurities. (Atomindex citation 10:481634)

CEA-CONF-4443 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Service de Chimie-Physique.
Magnetic Resonance Study of the Segmental Motion and Local Conformations of Poly-(L-Glutamic Acid) in Aqueous Solutions.
A. Tsutsumi, B. Perly, A. Forchioni, and C. Chachaty. 1978, 14p CONF-7809201-1
International conference on magnetic resonance in biological systems, Takayama, Japan, 11 Sep 1978.
U.S. Sales Only.

A study was made on: ESR of spin labeled poly (L-glutamic acid) (PLGA); proton chemical shifts and vicinal coupling constants; pH dependences of proton and deuteron relaxations; proton relaxation enhancement in spin labeled PLGA; proton and carbon 13 relaxations in neutral solutions. (Atomindex citation 10:493730)

CEA-CONF-4451 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Recherche et Analyse.
Analytical Separation of Americium and Curium, Using High Performance Liquid Chromatography.
A. Billon. 1978, 15p CONF-7809182-2
Radiochemical conference, Piestany, Czechoslovakia, 12 Sep 1978.
U.S. Sales Only.

Americium and curium are separated on a column of cation exchange resin (Aminex) using hydroxyisobutyric acid (alpha HIBA) as eluent, at a temperature of 80 exp 0 C. Americium and curium were detected in line using their alpha emission: the separation was performed in a shielded glove box whose setting-up is given. Finally, the time necessary for a separation is comprised between 30 min and 1 hr. The purity of separated fractions was assayed by mass-spectrometry. An application in the determination of isotopic composition of americium and curium in fuels is described. (Atomindex citation 10:493478)

CEA-CONF-4486 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Recherche et Analyse.
Isotopic Analysis of Carbon and Nitrogen by Means of a 2 MV van de Graaff.
C. Engelmann, and M. Loeuillet. 1978, 4p CONF-781113-42
Conference on application of small accelerators, Denton, TX, USA, 6 Nov 1978.
U.S. Sales Only.

The possibilities offered by the nuclear reactions: exp 12 C(p, gamma) exp 13 N; exp 14 N(p, gamma) exp 15 O; exp 13 C(p, gamma) exp 14 N; exp 15 N(p, alpha gamma) exp 12 C to estimate the isotopic concentration ratios exp 13 C/ exp 12 C, exp 15 N/ exp 14 N or exp 15 N/ exp 12 C were studied experimentally. Two kinds of gamma detector (Ge(Li) and NaI(Tl)) were used. It is evident that in view of its resolution the former is more discriminating (separation of neighbouring lines), but our results show that the use of a large NaI(Tl) detector is necessary when large batches of samples have to be examined quickly. (Atomindex citation 10:493493)

CEA-N-2069 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Protection.
Comparative Study of Mineralization Methods Applied to the Determination of Trace Metals in Suspensions by Atomic Absorption.
D. Boust, and P. Guegueniat. Feb 79, 14p
In French.
U.S. Sales Only.

Six mineralization methods -4 total and 2 partial ones- were compared with a view to the determination by atomic absorption of Ag, Co, Cr, Cu, Fe, Ni, Pb, Zn in suspensions in an estuarine environment. For activable elements, Co, Cr, Fe and Zn, the results were compared with those supplied by neutron activation analysis. (Atomindex citation 10:493483)

CEA-R-4906 MF **A01**
CEA Centre d'Etudes de Limeil, Villeneuve-Saint-Georges (France).
Production and Diagnostics of Intense Low Energy Bremsstrahlung Bursts (E < 400 KeV).
These (3e Cycle),
Jacques Chevallier. Mar 78, 107p
In French.
U.S. Sales Only. Microfiche copies only.

First, is a review of t essential bremsstrahlung's characteristics. Then the pulsed generator technology is briefly exposed. High and low impedance accelerators are introduced and the generator in use is described. The continuation of this work is devoted to a search for the best bremsstrahlung convertor and the computation of the spectrum by means of a Monte Carlo method. The diagnostic of the beam is began by the experimental study of the spectrum by the absorption method. Experimental results are treated by either an iterative method or by means of Laplace transform. With the use of spectrum and thermoluminescent dosimetry results, one can determine the ability of the generator to deposit energy in different materials (typicaly 2.10 exp 2 to 4.10 exp 2 grays in silicon and 8.10 exp 3 grays in gold). Finally the future application and development of these methods are considered in view of higher energy and intensity . (Atomindex citation 10:431306)

CEA-R-4961 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Protection.
Chelation of di- and Trivalent Iron with Some Polyaminopolycarboxylic Acids.
M. B. Hafez, N. Sharabi, and F. Patti. Feb 79, 16p
In French.
U.S. Sales Only.

The chelation of di- and trivalent iron with some polyaminopolycarboxylic acids was studied. The influence of pH on the formation of the complex was investigated, the molecular ratio and the stability constants were determined. (Atomindex citation 10:493607)

CEA-R-4966 MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Genie Radioactif.
Contribution to the Study of the Physico-Chemical Mechanisms of Metallic Cation Extraction by Alkylphosphoric Acids. Extraction of Zirconium (IV) By di-2-Ethylhexyl Phosphoric Acid (DEHPA).
These (D. es S.),
J. L. Carbonnier. Feb 79, 179p
In French.
U.S. Sales Only. Microfiche copies only.

Extraction of zirconium, especially at high concentration (0.1M), by dodecane diluted DEHPA (HA) from hydrochloric or nitric aqueous phases of 0.1 to 10 M acidity was studied. The composition, structure and polymerisation of the complexes extracted were determined by chemical analysis, viscosimetry, infrared spectrometry and light scattering. A Zr(OH) sub 2 A sub 2 .2HNO sub 3 , type structure is proposed for these complexes instead of the generally accepted form: Zr(OH) sub 2 (NO sub 3) sub 2 .2HA. Similarly in hydrochloric solution: Zr(OH) sub 2 A sub 2 .2HCl. Polymerisation in the organic phase results from the juxtaposition of two factors; firstly zirconium saturation (formation of bridges by DEHPA between zirconium atoms) and secondly the nature the equeous phase. In slightly acid hydrochloric solution (pH = 1.3) the aqueous plymers of zirconium are extracted in the organic phase as polynuclear complexes; in nitric solution no polynuclear complexes are observed but the nitric acid molecules extracted set up hydrogen bonds which explain the increased viscosity and gelification of the organic phases. (Atomindex citation 10:493572)

CEGB-RD/B/N-4029 PC **A03**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Technique for Measuring Hydrogen and Water in Inert Gases and the Hydrogen Concentration in Liquid Sodium.
C. A. Smith. Apr 78, 26p
U.S. Sales Only.

A method is described of measuring the hydrogen and water content of an inert gas. It is based upon the use of an electrochemical oxygen cell and has a high sensitivity at low hydrogen and water levels. The following possible applications of the method are described together with supporting experimental measurements: improving the sensitivity and range of the present PFR secondary circuit hydrogen detection instruments; the measurement of hydrogen diffusion coefficients in steels; the measurement of waterside corrosion rates of boiler steels; on-line monitoring of waterside boiler corrosion. Attention is given to the characteristics of diffusion barriers in relation to the first and last of these. (Atomindex citation 10:468670)

COO-2960-4 PC **A03**/MF **A01**
Connecticut Univ., Storrs. Inst. of Materials Science.
Electrode Polarization Studies in Hot Corrosion Systems. Progress Report, 1 June 1979-31 April 1980.
O. F. Devereux. Feb 80, 39p
Contract EY-76-S-02-2960

Work on the following discrete tasks is reported: Electrode Polarization Studies in Molten Sodium Carbonate: A comprehensive set of tests has been performed on iron, nickel, and types 304 and 316 stainless steel in gas mixtures of controlled CO, CO sub 2 , H sub 2 , and H sub 2 S pressures at a total pressure of one atmosphere and in a temperature range of 900 to 1000 exp 0 C. The polarization curves thus derived have been reduced to a set of empirical kinetic constants via computer modelling. Gas/Metal Reactions in Mixed Oxidants: Oxidation of iron in gas mixtures of controlled P/sub CO/, P/sub CO/ sub 2 , P/sub H/ sub 2 and P/sub H/ sub 2 /sub S/ at a total pressure of one atmosphere and a temperature of 900 exp 0 C has been studied. In the P/sub S/ sub 2 and P/sub O/ sub 2 ranges employed sulfide scales were formed; P/sub O/ sub 2 influenced the short term sulfidation kinetics. Specimen geometry was seen as a significant factor influencing long term kinetics. Liquid Line Corrosion: A reproducible corrosive attack is seen at the metal/molten carbonate/gas phase junction. This attack can be quantitatively evaluated and explained in terms of a diffusion model. Evaluation of Reaction Kinetics from Polarization Data (addendum): previous modelling procedures have been expanded to include one or more anodic reactions displaying passive behavior. (ERA citation 05:016270)

COO-4227-9 PC **A02**/MF **A01**
Chicago Univ., IL.
Coal Anion Structure and Chemistry of Coal Alkylation. Ninth Quarterly Progress Report, March 1-May 31, 1979.
L. M. Stock. 1979, 24p
Contract EF-77-S-02-4227

Five areas of research are discussed in this report. First, work on the synthesis of model compounds and on related control experiments is considered. Second, additional spectroscopic properties of tetrahydrofuran-soluble coal and butylated coal are discussed. Third, recent work with biphenyl as the electron transfer agent is examined. Fourth, more reductive alkylation reactions and some protonation reactions were carried out using potassium/

liquid ammonia to generate the coal polyanion. Fifth, the reactions of tetralin-d sub 12 and diphenylmethane-d sub 2 with coal and with other model compounds are investigated. (ERA citation 05:014700)

C00-4264-13 PC **A02**/MF **A01**
Pennsylvania State Univ., University Park.
Oscillator Strengths for Highly Ionized Atomic Systems. Final Report, May 1, 1977-December 31, 1979.
C. F. Fischer. Dec 79, 19p
Contract EG-77-S-02-4264

Oscillator strengths (or f-values) for resonance transitions in highly ionized atoms have assumed importance in fusion plasma research. Beam-foil spectroscopy has been able to deduce some of these values but present experimental limitations restrict its applicability. A theoretical study of trends along an isoelectronic sequence has provided an alternative approach. The Multi-configuration Hartree-Fock method (MCHF) is a general theoretical method for determining wavefunctions for atomic states from which oscillator strengths can be computed. A first-order theory has been shown to yield reliable f-values provided the ionization energy is predicted with reasonable accuracy and the transition matrix element is not sensitive to cancellation effects. General computer programs have been developed for this method and extended to include the dominant relativistic effects. (ERA citation 05:017186)

C00-4991-1 PC **A03**/MF **A01**
Cornell Univ., Ithaca, NY. Dept. of Chemistry.
ESR Studies of Surface Adsorption and Catalysis under Ultra-High Vacuum Conditions.
J. H. Freed. Nov 79, 29p
Contract ER-78-S-02-4991

In this first year since March, we have completed construction of the ESR-uhv system, and we have undertaken preliminary experiments with it, that have demonstrated the feasibility of the technique. With our newer ESR-uhv cavity we have achieved a sensitivity of 10 exp 12 spins per Gauss linewidth or close to theoretical. We have also developed in-situ techniques for ESR studies of surface adsorption and reactions of gases on (1) metals and oxides supported on crushed Vycor (ca. 1 torr); (2) metal wire and turnings and their oxides (ca. 1 torr); (3) metal powders (ca 10 exp -7 to 10 exp -8 torr). With NO sub 2 /Vycor, temperature-dependent adsorbed NO sub 2 spectra were observed which are amenable to a slow-tumbling analysis. A comparison of exp 63 Cu hyperfine parameters from NO sub 2 on Cu/Vycor vs pure Cu has lead to the tentative conclusion that on the pure metal adjacent sites become paramagnetic, but the Cu exp 2+ is forming on surfaces that are microscopically crystalline, so that adjacent Cu exp 2+ ions have identical orientations of their g-tensor, although the macroscopic sample is polycrystalline. Related studies on the uhv-ESR cavity have been performed on the NO sub 2 -Cu/Vycor system. An intense cyclotron resonance signal is observed in our uhv-ESR cavity at pressures less than 10 exp -2 torr. It has a g-factor of 2.000 and is attributed to microwave stimulation of exo-electron emissions. It may also be suppressed by the use of reduced microwave power.We have completed preliminary studies of oxygen ion radical (O sub 2- and O exp -) formation on partially reduced Ti on Vycor support. The process is greatly assisted by uv irradiation. Different types of O sub 2- and O exp - ESR signals are obtained and are correlated with differences in preparation and previous work with other supports. (ERA citation 05:016248)

CRN-CNPA-78-7 PC **A02**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Quantum Dynamics of a Molecule (Atom) in a Coherent Radiation Field.
K. F. Freed, and A. A. Villaeys. 1978, 20p
U.S. Sales Only.

The description of the quantum dynamics of a two level system interacting with a single Glauber coherent mode of the radiation field is considered. An exact solution (within the rotating wave and electric dipole approximations) is provided for both the time-dependent Green's functions for the coupled matter-radiaton system. The atomic (molecular) transition probabilities are shown to be Poisson averages of the corresponding semiclassical problem when the latter is likewise treated in the rotating wave approximation. At low radiation intensities the quantum and semiclassical results differ, but a high intensities they become the same when the average photon number, n sub 0 in the field satisfies the condition n sub 0 sup(1/2) very superior to 1. A similar behavior is displayed for the expectation value of electric field of the coherent mode in the presence of the atom. The spectrum of the radiation, resonantly scattered by the atom, is shown to coincide with the results of Mollow. (Atomindex citation 10:481457)

CRN-CPR-78-16 PC **A02**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Luminescence Decay in Condensed Argon under High Energy Excitation.
M. J. Carvalho, and G. Klein. 1978, 9p
U.S. Sales Only.

alpha and beta particles were used to study the luminescence of condensed argon. The scintillation decay has always two components independently of the phase and the kind of the exciting particles. Decay time constants are given for solid, liquid and also gaseous argon. Changes in the relative intensity values of the two components are discussed in terms of track effects. (Atomindex citation 10:481455)

DOE/ER/01198-1300 MF **A01**
Illinois Univ. at Urbana-Champaign.
Nonohmic Electrical Conductivity and Giant Dielectric Constant in Methyltriphenylarsonium Ditetracyanoquinodimethane.
P. M. Lenahan. Nov 79, 108p
Contract AC02-76ER01198
Thesis.
Microfiche copies only.

Quite large, well-formed single crystals of m phi sub 3 As(TCNQ) sub 2 crystals have been grown. The largest of these crystals are probably the largest TCNQ salt crystals ever grown; they may also be the most perfect. It has been shown that m phi sub 3 As(TCNQ) sub 2 has a large, highly anistropic dielectric constant and a nonohmic conductivity. Nonohmic conductivity and a large dielectric constant have been observed in a number of quasi-one-dimensional conductors and semiconductors. A number of models have been proposed to explain both phenomena. None of the published models adequately explains the nonohmic conductivity observed in m phi sub 3 As(TCNQ) sub 2 . A model based upon charged imperfections in the conducting (TCNQ) strands is developed; it explaines the data quite well. The charged imperfections act as barriers in the conducting strands. Rice and Bernasconi explain the large anisotropic dielectric constant observed in quasi-one-dimensional conductors in terms of a model based upon barriers in the conducting strands. Their model, with minor modifications, explains our dielectric constant measurements quite well. The concentration of charged imperfections was assumed to be equal to the concentration of paramagnetic impurities, which were measured using magnetic resonance techniques. Approximate agreement between the measured imperfection level, the nonohmic behavior, and the dielectric constant were found. A rather wide range of experimental techniques (conductivity and dielectric constant measurements, nuclear and electron spin resonance) all yield data which are in agreement with the proposed model. (ERA citation 05:015137)

DOE/ER/70004-258 PC **A02**/MF **A01**
Oregon Univ., Eugene. Inst. of Theoretical Science.
Correlation Holography: Imaging of Atoms when sigma/sub Inelastic//Sup >>sigma/ Elastic.
P. L. Csonka. 1979, 10p RLO-2230-T4-258
Contract EY-76-S-06-2230-004

Atomic-scale resolution of details is possible with this method, even if protons interact with the atoms overwhelmingly inelastically, i.e. when sigma/sub inelastic/ >>sigma/sub elastic/. Observation of small objects is compatible with quantum mechanics even if the disturbance of the object caused by the observation process is arbitrarily small. (ERA citation 05:016985)

DOE/ET/15422-T1 PC **A02**/MF **A01**
ENCOTH Corp., Princeton, NJ.
Electron Mobility for Arbitrary Cross Section. Research Status Report No. 79-0001 for the Period February-May 1979.
L. E. Hernquist, and M. L. Sloenescu. 1979, 18p
Contract AC02-79ET15422

Approximating the electron-atom elastic collision cross section as a piecewise linear function of electron speed, one is able to express analytically the electron mobility as a function of density, temperature and cross section. Results are given for a two term expansion in Sonine polynomials of the speed dependent functions of the classical expansion of the electron velocity distribution function. The method is particularly appropriate for determining the sensitivity of mobility to cross section and the variation of mobility with atomic species. (ERA citation 05:016990)

DOE/ET/15422-T3 PC **A03**/MF **A01**
ENCOTH Corp., Princeton, NJ.
Steady State Boltzmann Equation Solution by Numerical Relaxation. Technical Status Report No. 79-0002 for the Period June 1979.
T. M. Smith. 1979, 44p
Contract AC02-79ET15422

A procedure for the numerical solution of the steady state Boltzmann equation in one configuration space and two velocity space dimensions is described. The diffusive character of the Fokker-Planck collision terms is utilized to construct a numerical relaxation scheme. The mathematical problem and numerical algorithm are discussed, and the present state of computational development is indicated. Details of existing computer code and results of computations are presented. (ERA citation 05:017006)

DOE/ET/15422-1 PC **A11**/MF **A01**
ENCOTH Corp., Princeton, NJ.
ENCOTH Corporation Progress Report, February 13, 1979-August 30, 1979. Volume 1.
T. M. Smith. 1979, 226p
Contract AC02-79ET15422

Computer codes are presented for electron mobility cross-sections, numerical solution of Boltzmann equation, collision matrices in the Boltzmann equation, and two-dimensional electron temperature profiles. Separate abstracts for six individual items were prepared for the data base. (ERA citation 05:016986)

IAEA-R-1771-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Accurate Determination of the Thermochemical Properties of Uranyl Halides. Final Report for the Period 1 July 1976 - 30 June 1978.
E. H. P. Cordfunke. Oct 78, 6p
U.S. Sales Only.

Enthalpies of formation were determined by solution calorimetry for UO sub 2 Br sub 2 .H sub 2 O, UO sub 2 Br sub 2 .3H sub 2 O and UO sub 2 (OH)Br.2H sub 2 O. Enthalpy increments, Hdeg(T) - Hdeg(298.15K), were determined for UO sub 2 F sub 2 , UO sub 2 Cl sub 2 , and UO sub 2 Br sub 2 by drop calorimetry. (Atomindex citation 10:481660)

IPNO-T-79-03 PC **A04**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Barium and Radium Radiopolarography.
These (3e Cycle),
B. Fourest. 1979, 69p
In French.
U.S. Sales Only.

Radiopolarography has been applied to the study of two elements (barium and radium) which is difficult by classical polarography because of their strong electropositivity. Various parameters have been considered: nature, concentration and pH of supporting electrolyte. In any case of investigated mediums, the reduction to the metallic state reaction appeared to be reversible. An important variation of the barium half-wave potential E 1/2 with the ionic strength mu of the solution, imposed by LiCl used as supporting electrolyte, has been observed. It gives the possibility to estimate, for mu

= 0, E 1/2 (Ba) = - 1.916 V/S.C.E. and E 1/2(Ra) = - 1.852 V/S.C.E. The values of barium and radium half wave potentials, obtained with a good accuracy in LiCl (or LiClO sub 4) 0.1 M medium, have been used to establish the amalgamation energy delta sub 2 (M) of these elements. A linear variation of delta sub 2 (M) with the metallic radius of the 2a elements has been obtained. On the other hand, by making the concentration of the complex forming agent (Cit exp 3-) vary in the solution, we have a shift in the half wave potential from which we can deduce the stability constant of the complexe and its composition (BaCit exp - ; pK sub 1 =2). At last, nature and concentration of the supporting electrolyte (between 5.10 exp -2 M and 5M) have a determining influence on the extent of the polarogram plateau. This plateau is limited by an 'hollow effect' preceding the supporting electrolyte discharge. An interpretation of this effect is suggested which is based on the Stern model. (Atomindex citation 10:493757)

IRNE-125-1978 PC **A02**/MF **A01**
Institutul de Reactori Nucleari Energetici, Pitesti (Romania).
Zirconium and Niobium Extraction from HCl Media with di-N-Butyl Phosphorodithioic Acid.
V. C. Iliescu. Apr 78, 6p
U.S. Sales Only.

The solvent extraction of zirconium and niobium din-butyl phosphoroditioate into organic diluents from HCl media is presented. The effect of extractant and mineral acid concentration on the zirconium and niobium distribution ratios as plots of lg. distribution ratios vs.lg.molarity of the extractant and HCl are presented. On this basis the extraction mechanism is supposed. The effect of the organic diluents against zirconium and niobium distribution ratios has been determined. (Atomindex citation 10:493612)

IS-T-884 PC **A09**/MF **A01**
Ames Lab., IA.
Mathematical Model of the Chemistry of the Dump Leaching of Chalcopyrite.
K. C. Liddell. Mar 80, 182p
Contract W-7405-ENG-82
Thesis.

In a leach dump, chalcopyrite is dissolved by Fe exp 3+ and by O sub 2 and H exp + . Neither reaction is at equilibrium under operational conditions. The solution contains Fe(III), Fe(II) and Cu(II) in an aqueous sulfate medium with a pH of about 2. The equilibrium concentrations of H exp + , OH exp - , SO sub 42- , HSO sub 4- , Fe exp 3+ , FeOH exp 2+ , Fe(OH) sub 2+ , Fe sub 2 (OH) sub 24+ , FeSO sub 4+ , Fe(SO sub 4) sub 2- , FeHSO sub 42+ , Fe exp 2+ , FeSO sub 40 , FeHSO sub 4+ , Cu exp 2+ and CuSO sub 40 were calculated for different Fe sub 2 (SO sub 4) sub 3 , FeSO sub 4 , CuSO sub 4 and H sub 2 SO sub 4 analytical concentrations using both ideal solution and high ionic strength apparent equilibrium constants. Conditions under which Fe exp 3+ precipitates have been investigated by including K/sub Sp/ values as constraints in the computer program. Jarosite, KFe sub 3 (SO sub 4) sub 2 (OH) sub 6 , precipitates except when the K exp + concentration is very small. Formation of goethite, alpha -FeOOH, occurs through aging of amorphous Fe(OH) sub 3 ; ferric hydroxide precipitation is favored by high Fe exp 3+ concentrations and high pH. With both dissolution reactions occurring, it was found that the H exp + consumed was partially restored by dissociation of HSO sub 4- , FEHSO sub 42+ and FeHSO sub 4+ . With no O sub 2 reacting, there were only slight changes in the H exp + and HSO sub 4- concentrations and FeHSO sub 4+ was a product. The maximum copper concentration was obtained with high starting Fe sub 2 (SO sub 4) sub 3 concentrations and little or no O sub 2 consumption. Too large an amount of O sub 2 reacting led to pH increases that caused precipitation of Fe(OH) sub 3 . (ERA citation 05:016251)

ISM-261 PC **A02**/MF **A01**
Ames Lab., IA.
Estimation of Average Polynuclear Aromatic Ring Size in an Iowa Vitrain and a Virginia Vitrain.
B. C. Gerstein, L. M. Ryan, and P. D. Murphy. 1979, 14p CONF-7904126-1
Contract W-7405-ENG-82
Coal structure conference, Honolulu, HI, USA, Apr 1979.

High-resolution techniques for nuclear magnetic resonance (NMR) in solids have been used to obtain spectra of exp 13 C and exp 1 H in an Iowa and a Virginia vitrain. The carbon spectrum separated into two well defined peaks from which an aromatic and aliphatic portion was estimated. A superposition of Lorentzian lines was used to represent the aliphatic and aromatic proton signals, which were not well separated under high-resolution techniques. The fractions of aromatic carbon and hydrogen thus obtained were used to estimate an average polynuclear aromatic ring size in the coals studied. (ERA citation 05:014705)

JAERI-M-7801 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Study on Analytical Methods of Radioiodine in a High-Temperature, High-Pressure Water in-Pile Loop.
K. Yamamoto, S. Okagawa, I. Yokouchi, H. Tone, and H. Itami. Aug 78, 15p
In Japanese
U.S. Sales Only.

Defect fuel tests have been carried out in the high-temperature, high-pressure water in-pile loop (OWL-1) of JMTR. The analytical methods of radioiodine released into the loop water during these experiments were studied. It was shown that the results by the analytical method, in which radioiodine (I exp -) was oxidized to I exp 0 and extracted into CCl sub 4 , were influenced by the chemical forms of radioiodine. It was also shown that the method in which KI and KIO sub 3 were added as carrier, was appropriate for the measurement of radioiodine in the loop water. (Atomindex citation 10:468682)

JEN-442 PC **A02**/MF **A01**
Junta de Energia Nuclear, Madrid (Spain).
Uranium Isotopic Determination by alpha Spectroscopy.
M. Acena, and E. Garcoa-Torano. 1979, 20p
In Spanish.
U.S. Sales Only.

A method for alpha-spectrometry determinations of uranium isotopes, using surface barrier detectors, is described. This method is based in the shape similarity of the most intense line groups for the nuclides exp 234 U, exp 235 U, exp 236 U and exp 238 U. The method yields analytical results sufficiently accurate in samples with exp 235 U contents lower than 25% in atoms. (Atomindex citation 10:481620)

JINR-18-12262 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Neutron Activation Analysis Application to the Investigation of Some Data on Water-Salt Exchange.
M. V. Golovanov, A. S. Shilovtseva, N. A. Gundorin, S. F. Gundorina, and B. Otgooloi. 1979, 15p
In Russian.
U.S. Sales Only.

The express method of K, Na, Ca, Mg, P, Cl macroelements content determination in invaded and noninvaded tissues and also in biological liquids of experimental animals (rats) is presented. Its aim is the investigation of some data on watersalt exchange in vitro with sensitivity (10 exp -4 - 10 exp -6)g/g over wet weight and an error from 5% for Na and Cl to 15% for K and Ca. The obtained results evidence for element composition changes during Walker's carcinosarcoma growth. On the fifth day after reinoculation the sufficient deficit of Ca in bone has been marked. Ca, Cl and Na content in muscle tissue adjoining to tumour and in the tumour itself is 2-3 times higher than in the muscle tissues of the control group. On the tenth day Ca content in brain was four times less than in the control group. Due to a considerable value of nature dispersion of the element content of tissues of experimental animals a complete quantitative description of the dynamics of the element content change in the process of Walker's carcinosarcoma growth can not be achieved. The IBR-30 reactor with thermal and fast neutron flux density up to 3x10 exp 10 n/cm exp 2 xc in the pneumotransport channel has been used as a neutron source. (Atomindex citation 10:493500)

JINR-6-12119 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Composition Analysis of a exp 249 Bk- exp 249 Cf Mixture by X-Rays.
G. V. Buklanov, and Yu. P. Kharitonov. 1979, 9p
In Russian.
U.S. Sales Only.

An experimental possibility for the composition analysis of exp 249 Bk - exp 249 Cf mixtures has been demonstrated. Yields of X radiation L-lines at decay of exp 249 Bk and exp 249 Cf have been determined. Due to high beta -activity of exp 249 Bk relatively small quantities of Bk (approximately 0.01 mu g) can be detected using X-rays during 5-10min. In the case the exp 249 Bk - exp 249 Cf mixture composition can be thus determined in a wide range of relative concentrations of Bk in Cf: about from 0.03 to 80. In comparison with routine methods using alpha - and gamma - radiations the X-ray spectrometry is shown to extend the limits of the analysis. (Atomindex citation 10:493485)

KFK-2708 PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Radiochemie.
Lithium or Cesium Assay in Saturated Salt Solutions Obtained in Leaching Experiments on Bitumen/Salt Mixtures.
E. Mainka, and M. Hartmann. Oct 78, 7p PWA-75/78
In German.
U.S. Sales Only.

Optical working conditions are determined for the assay of cesium in saturated alkali salt solutions. The propane-air flame preferred cannot be used for excitation since the three-slot burner required gets plugged up by the high salinity of the sample. In this case the hydrogen air flame has proved its worth which can be generated also with a broad slot burner. The conditions of measurement are tested and the correctness of analytical results verified using independent methods. Experience gathered in cesium assay can be utilized also in lithium assay. (Atomindex citation 10:468643)

LA-7978-PR PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Development of a Sampling and Analytical Method for Ethylenimine. Progress Report, January 1-October 31, 1978.
R. Morales, J. F. Stampfer, R. E. Hermes, E. E. Campbell, and H. J. Ettinger. Dec 79, 14p
Contract W-7405-ENG-36

A sampling and analytical method to monitor ethylenimine in air is described. Ethylenimine was designated as a carcinogen by the Occupational Safety and Health Administration in 1974. A midget bubbler containing Folin's reagent was used to collect ethylenimine vapors from laboratory generated challenge atmospheres. Folin's reagent converts ethylenimine vapors to 4-(1-aziridinyl)-1,2-naphthoquinone, which is extracted and analyzed by high performance liquid chromatography. The method was evaluated over the range 1.2 to 795 mu g/sample and has a precision of 7%. (ERA citation 05:017995)

LBL-10377 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Alkyl, Hydride, and Related Bis(Trimethylsilyl)-Amide Derivatines of the 4F- and 5F-Block Metals.
R. A. Andersen. Dec 79, 19p CONF-790917-20
Contract W-7405-ENG-48
American Chemical Society national meeting, Washington, DC, USA, 10 Sep 1979.

Physical properties (magnetic susceptibility, NMR, crystal structure, etc.) are reviewed for trivalent lanthanide/actinide derivatives, divalent lanthanide derivatives, and tetravalent actinide derivatives. (ERA citation 05:016255)

LBL-10410 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.

Chemical Actions of Ionizing Radiation on Oligopeptide Derivatives of Glycine in the Neutral (Zwitterion) and Basic Forms.
W. M. Garrison, and H. A. Sokol. Jan 80, 12p
Contract W-7405-ENG-48

Effects of protonation of the terminal NH sub 2 group on the relative yields of reductive deamination and deamidation by e exp - in the gamma - radiolysis of di, tri and tetra glycine in the solid state are described. The experimental data provide direct chemical evidence of specific sites of addition of e exp - to c = o bonds along the peptide chain. (ERA citation 05:016275)

LYCEN-7828 PC **A02**/MF **A01**
Lyon-1 Univ., Villeurbanne (France). Inst. de Physique Nucleaire.
Coverage Dependent Photoelectron Spectroscopy of CO Chemisorption on Cu (111): Evidence for Two Adsorption Sites.
Y. Jugnet, and M. D. Tran. Jun 78, 14p
U.S. Sales Only.

The ultraviolet photoelectron spectra (UPS) of CO adsorbed on (111) face of Cu are found to be dependent of coverage from exposure of 0.3L up to saturation. At lowest dose two intense molecular orbitals are observed at binding energies of 8.7 and 11.7 eV - phase I -. The intensity of two additional structures at 9.6 and 13.7 eV is fastly enhanced with increasing exposure - phase II -, more weakly bound, yielding at saturation coverage the complex four peak spectra usually reported for CO and Cu. We therefore reassign the levels at 11.7 and 8.7 eV to the 4SIGMA and overlap of molecular orbitals of CO adsorbed on top position and the levels at 13.7 and 9.6 eV to the same for CO adsorbed on bridge position. (Atomindex citation 10:481670)

NIIAR-P-17(311) PC **A03**/MF **A01**
Nauchno-Issledovatel'skii Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR).
Investigation of Crystal Structure of Sodium Monocarbonatoneptunoylate Hydrate Forms.
Yu. F. Volkov, S. V. Tomilin, V. I. Spiryakov, G. I. Vlayashcheva, and I. I. Kapshukov. 1977, 27p
In Russian.
U.S. Sales Only.

The crystal structure of five hydrate forms of sodium monocarbonatoneptunoylate of the composition: NaNpO sub 2 CO sub 3 x3.5 H sub 2 O(1), NaNpO sub 2 CO sub 3 x3H sub 2 O(2), NaNpO sub 2 CO sub 3 x2H sub 2 O(3), NaNpO sub 2 CO sub 3 xH sub 2 O(4) and NaNpO sub 2 CO sub 3 (5) is studied by the X-structural and infrared spectroscopic analyses. On the base of powder radiograms the crystal lattice parameters are determined. It has been found that the structure of all compounds comprises the layers (NpO sub 2 CO sub 3) exp - (permanent composition and structure), isostructural layers (UO sub 2 CO sub 3) deg of reserfordine mineral. The Na exp + ions and H sub 2 O molecules are placed between the anion layers (NpO sub 2 CO sub 3) exp - and realize the bond between them. It is shown that hydration and dehydration of 1-5 compounds proceeds easily because of weak bond forces between layers. (Atomindex citation 10:493783)

NRCN-ms-1 MF **A01**
Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev.
Multiphoton Excitation and Dissociative Ionization of SF sub 6.
E. Bar-Ziv, and O. Kafri. Jan 78, 10p
U.S. Sales Only. Microfiche copies only.

A simple model of SF sub 6 multiphoton excitation enabling the evaluation of the laser enhancement probabilities of the dissociative ionization processes is presented. The model could reproduce the experimental results of Brunner by assuming three photon saturation absoprtion law. (Atomindex citation 10:419522)

NRCN-443 PC **A07**/MF **A01**
Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev.
Delbrueck Scattering of Monoenergetic Photons.
Thesis (Ph. D.),
S. Kahane. May 78, 131p
In Hebrew.
U.S. Sales Only.

The Delbrueck effect was experimentally investigated in high Z nuclei with monoenergetic photons in the range 6.8-11.4 MeV. Two different methods were used for measurements of the differential scattering cross-section, in the 25-140 deg range and in the forward direction (theta = 1.5 deg), respectively. The known Compton scattering cross-section was used in a new and unique way for the determination of the elastic scattering cross-section. Isolation of the contribution of the real Delbrueck amplitudes to the cross-section was carried out successfully. Experimental confirmation of the theoretical calculations of Papatzacos and Mork and measurement, for the first time, of the Rayleigh scattering in the 10 MeV region are also reported. One of the most interesting findings is the presence of Coulomb corrections in Delbrueck scattering at these energies. More theoretical effort is needed in this last direction. (Atomindex citation 10:431320)

NRCN-466 PC **A03**/MF **A01**
Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev.
Theoretical Models for Recombination in Expanding Gas.
Y. Avron, and S. Kahane. Sep 78, 29p
In Hebrew.
U.S. Sales Only.

In laser isotope separation of atomic uranium, one is confronted with the theoretical problem of estimating the concentration of thermally ionized uranium atoms. To investigate this problem theoretical models for recombination in an expanding gas and in the absence of local thermal equilibrium have been constructed. The expansion of the gas is described by soluble models of the hydrodynamic equation, and the recombination by rate equations. General results for the freezing effect for the suitable ranges of the gas parameters are obtained. The impossibility of thermal equilibrium in expanding two-component systems is proven. (Atomindex citation 10:431299)

NRCN-474 PC **A02**/MF **A01**
Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev.
Spectrochemical Analysis of Impurities in Magnesium.
Z. Goldbart, A. Harel, A. Lorber, and A. Lichinsky. Jun 79, 15p
In Hebrew.
U.S. Sales Only.

A spectrochemical method for the determination of 28 impurities in magnesium (metal) as well as in its compounds is described. (Atomindex citation 10:478814)

N80-22451/2 PC **A04**/MF **A01**
Max-Planck-Institut fuer Stroemungsforschung, Goettingen (Germany, F.R.).
Liquid-Vapor Saturation Density Data.
D. Rathmann, D. A. Sullivan, and P. A. Thompson. Mar 79, 75p MPIS-8/1979

Tables are presented for 72 gases and liquids. The values of the tables and the first critical data set correspond to the first cited reference on each page. The second critical data set refers to the authors' given as second (and third) citation. Most of the values given in the tables were reduced using the first critical data set.

N80-23111/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Two-Photon Excitation Cross-Section in Light and Intermediate Atoms.
K. Omidvar. Mar 80, 49p NASA-TM-80661
Revised. Submitted for Publication.

The method of explicit summation over the intermediate states is used along with LS coupling to derive an expression for two-photon absorption cross section in light and intermediate atoms in terms of integrals over radial wave functions. Two selection rules, one exact and one approximate, are also derived. In evaluating the radial integrals, for low-lying levels, the Hartree-Fock wave functions, and for high-lying levels, hydrogenic wave functions obtained by the quantum defect method are used. A relationship between the cross section and the oscillator strengths is derived. Cross sections due to selected transitions in nitrogen, oxygen, and chlorine are given. The expression for the cross section is useful in calculating the two-photon absorption in light and intermediate atoms.

N80-23181/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Effect of Silicate Ions on Electrode Overvoltage.
J. M. Gras, and C. Seite. Dec 79, 14p NASA-TM-75760
Contract NASW-2791
Transl. Into English of Effet des Ions Silicate sur les Surtensions d'Electrodes (Paris), Rept-p/539/77/24, Jun. 1977 10 p. Translation Was Announced as N79-27413. Transl. By Sci. Transl. Serv., Santa Barbara, Calif. Original DOC. Prep. By Elec. De France, Paris.

The influence of the addition of a silicate to a caustic solution (KOH) is studied in order to determine the degree to which silicates inhibit the corrosion of chrysotile under conditions of electrolysis at working temperatures of 100 C and above. In an alkaline solution containing various silicate concentrations, current density was increased and electrode overvoltage was measured. Results show that silicate ion concentrations in the electrolyte increase with temperature without effecting electrochemical performance up to 115 C at 700 MA/sqcm. At this point the concentration is about 0.5 g Si/100 g KOH. Beyond this limit, electrolytic performance rapidly degenerates due to severe oxidation of the electrodes.

PAT-APPL-6-129 061 PC **A02**/MF **A01**
Department of the Navy Washington DC
Sulfur Dioxide Detector.
Patent Application,
J. Andre Amy, and Harvard C. Huber. Filed 10 Mar 80, 10p AD-D007 172/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A composition is provided for detecting the presence of sulfur dioxide by changing color. One type of composition is prepared by mixing a small amount of finely ground potassium permanganate with finely powdered activated silica gel to produce a lilac colored material which will turn white in the presence of sulfur dioxide. Another type of composition is prepared by soaking silica gel in an aqueous solution of potassium permanganate to produce an amber colored material which will turn white in the presence of sulfur dioxide. Both types of detecting material can be combined with silicone rubber and molded into various shapes. (Author)

PB80-176449 PC **A04**/MF **A01**
Case Western Reserve Univ., Cleveland, OH. Dept. of Biomedical Engineering.
Research Needs and Opportunities in Mixing, Including Particulates. National Science Foundation Workshop, Held at Rindge, New Hampshire on August 21-26, 1977,
Robert J. Adler. 3 Jul 79, 71p NSF/RA-790401
Grant NSF-ENG77-20150
Prepared in cooperation with Engineering Foundation, New York.

This sixth biennial mixing conference considered fruitful research directions as perceived by a cross-section of professionals in the field. A corollary result was the exchange and dissemination of theoretical, experimental, and practical information on mixing. The presentations encompassed a wide variety of areas within the general field of mixing. The 22 papers presented cover all phases of mixing including homogeneous solutions, liquid-liquid dispersions, solid-liquid slurries, gas-liquid contactors, and solid-gas-liquid systems. Viscosities of fluids reported a range from low to extremely high, and include non-newtonian fluids. Basic and applied aspects of blending, suspensions, mass transfer, dispersion, chemical or biological reactions, heat transfer, and scale-up are discussed. Presentations highlight the complicated nature of mixing systems and the desire of workers

in the field to understand these systems. Many creative, specific suggestions and formative ideas emerge from these papers. The report presents a comprehensive summary of the papers together with transcriptions of the presentations.

PB80-177017 PC A02/MF A01
Environmental Research Lab., Athens, GA.
Photoreactivity of Aquatic Pollutants Sorbed on Suspended Sediments,
Glenn C. Miller, and Richard G. Zepp. Jul 79, 6p EPA-600/J-79-067
Pub. in Environmental Science and Technology, p860-863 Jul 79.

A technique is described that can be used to ascertain the photoreactivity of chemicals sorbed on particulates suspended in water. The influence of sorption on photoreactivity is disentangled from the effects of light attenuation and scattering by the sorbent. When this technique was employed, the photoreactivity of two hydrophobic chemicals was determined on sediments obtained from three widely separated water bodies in the United States. Kinetic and product studies indicate that the sorbed chemicals are in a less polar microenvironment that is a considerably better hydrogen atom donor than water.

PB80-177090 PC A10/MF A01
National Bureau of Standards, Washington, DC. National Measurement Lab.
Characterization of Particles. Proceedings of the Particle Analysis Session of the Annual Conference of the Microbeam Analysis Society (13th), Held at Ann Arbor, Michigan on June 22, 1978.
Final rept.,
Kurt F. J. Heinrich. Apr 80, 222p NBS-SP-533

This document contains a series of invited papers on the subject of Particle Characterization. Part of the material presented here was presented orally at the Thirteenth Annual Conference of the Microbeam Analysis Society, at Ann Arbor, Michigan, on June 22, 1978. The publication describes microscopic and analytical techniques for the characterization of single microscopic particles. Applications of these techniques to problems of general interest are also included.

PB80-177330 PC A02/MF A01
Health Effects Research Lab., Research Triangle Park, NC. Environmental Toxicology Div.
Low- and High-Resolution Gas-Chromatography-Mass Spectrometry (GC-MS) Method of Analysis for the Presence of 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) in Environmental Samples,
R. L. Harless, and E. O. Oswald. 1978, 9p EPA-600/J-78-165
Pub. in Dioxin-Toxicology and Chemical Aspects, ch6 p51-57, 1978.

An environmental monitoring project is being conducted to determine if TCDD is accumulating in the environment. TCDD is an extremely toxic, chlorocrigenic, and teratogenic material and is a possible contaminating by-product in manufacturing processes utilizing tetrachlorbenzene and in the manufacture of herbicides containing esters of 2,4,5-trichlorophenoxy acetic acid. The single oral LD(50) of this compound in certain species of guinea pigs is six hundred parts per trillion (600 ppt).

PB80-177348 PC A02/MF A01
California Univ., Davis.
Photosolvolysis of 3,4-Dichloroaniline in Water: Evidence for an Aryl Cation Intermediate.
Journal article,
Glenn C. Miller, Michael J. Miille, Donald G. Crosby, Steven Sontum, and Richard G. Zepp. 18 Sep 78, 7p EPA-600/J-79-058
Pub. in Tetrahedron, v35 n15 p1797-1800 1979.

Irradiation of 3,4-dichloroaniline in water (lambda > 290nm) gave 2-chloro-5-aminophenol with a conversion of 78 plus or minus 5%. The photolysis quantum yield at 313nm of 0.05 plus or minus 0.003 was unaffected by cyanide (0.35M) or pH changes between 4 and 12. A MO calculation indicated a large excited singlet state shift in electron density to the carbon undergoing substitution. The reaction is suggested to proceed through an aryl cation intermediate produced by heterolytic cleavage of the meta carbon-chlorine bond. Reaction from the triplet state is not considered likely since neither oxygen nor sorbic alcohol affected the quantum yield.

PB80-177769 PC A02/MF A01
Environmental Monitoring and Support Lab., Research Triangle Park, NC. Quality Assurance Branch.
Homogenizing Sludge Produces Unexpected Mercury Results.
Final rept.,
W. J. Mitchell, M. R. Midgett, J. Suggs, R. J. Velten, and D. Albrinck. 1979, 5p EPA-600/J-79-070
Pub. in Jnl. Pollution Engineering, v11 p69-70 Sep 79.

A method to homogenize sewage sludge prior to analysis for mercury and other trace elements is described.

PB80-177777 PC A02/MF A01
Environmental Research Lab., Athens, GA.
Electrochemical Methods Applied to the Analysis of Environmental Samples,
Thomas B. Hoover. 1978, 13p EPA-600/J-78-167
Pub. in Jnl. Environmental Chemistry and Cycling Processes, Department of Energy, Washington, DC, DOE Symposium Series 45, p221-231, 1978.

The fundamental principles of electroanalytical methods based on potentiometry, coulometry, conductance, and voltammetry are reviewed, and examples are given of applications to environmental analyses.

PB80-177793 PC A02/MF A01
Environmental Research Lab., Athens, GA.
Survey Analysis of Phenolic Compounds in Industrial Effluents by Gas Chromatography-Mass Spectrometry.
Journal article,
W. M. Shackelford, and R. G. Webb. 1979, 15p EPA-600/J-79-056
Pub. in Journal of Measurement of Organic Pollutants in Water and Wastewater, ASTM STP 686 p191-205 1979.

Analyzing industrial effluents for phenolic compounds involves a number of problems both in the separation of these compounds from the aqueous medium and in the chromatography of the extracted compounds. Use of continuous liquid-liquid extractor improved the recovery of phenolic compounds from those effluents that formed intractable emulsions during liquid-liquid extraction by shake-out. Tenax GC and SP1240 DA proved to be the best general purpose gas chromatographic column packings for a broad range of phenolic compounds. Derivatization procedures using diazomethane and pentafluorobenzyl bromide were found to be successful only under rigorously controlled conditions. For survey work, it appears that derivatization is of questionable value for initial qualitative analysis because, in many cases, the character of the matrix is not known.

PB80-178023 Not available NTIS
National Bureau of Standards, Washington, DC.
Oxide Formation on Ruthenium Observed by TDS and ESCA.
Final rept.,
R. Klein, R. Siegel, and N. E. Erickson. Apr 79, 3p
Pub. in Journal of Vac. Science Technology 16 n2 p489-491 Apr 79.

Oxygen adsorbed at room temperature on a Ru(101-bar 0) surface shows a single peak in its thermal desorption curve, the peak maximum shifting to lower temperature with higher initial concentration in accordance with second order kinetics. Additional peaks in the thermal desorption spectrum of oxygen from Ru(101-bar 0) were observed after exposure of the ruthenium above 600 K to oxygen. These peaks, desorbing with first order kinetics, are attributed to oxide formation. The change in the size of the peaks with respect to the temperature of the surface during oxygen exposure is correlated with an oxygen sticking coefficient that is constant up to 850 K and decreases thereafter. The ESCA spectrum of a surface with the 'oxide' showed an increase in the height of the 0(1s) peak but no chemical shift. Sulfur adsorbed on Ru(101-bar 0) prevents the adsorption of oxygen.

PB80-178130 Not available NTIS
National Bureau of Standards, Washington, DC.
The K-edge Photoabsorption Cross Section of Lithium Vapour.
Final rept.,
G. Mehlman, D. L. Ederer, E. B. Saloman, and J. W. Cooper. 1978, 4p
Pub. in Jnl. Phys. B: Atom. Molec. Phys., v11 n22 pL689-L692 1978.

The photoabsorption cross section of lithium vapor has been measured between 200 and 172 A. The average cross section is about 2 Mb in this region. Preliminary estimates of branching ratios for absorption leaving the ion in each of the n = 2 states are obtained from the data. The resonance structure in this region, which is compatible with earlier work, is discussed.

PB80-178320 PC A04/MF A01
Computer Corp. of America, Cambridge, MA.
The Design of a System for Pre-Prototype Use of the Chemical Substances Information Network.
Technical rept.,
Donald E. Eastlake, III, Aren J. Horowitz, and David A. Low. 31 Dec 79, 54p CCA-79-26
Contract EQ8AC028

This document presents the design of a system which assists users in the retrieval of related data from remote chemical information systems. The design employs an intelligent terminal to generate commands to and 'capture' output from remote systems, transform data output by one system into input to another system, and 'substitute' data files for keyboard input. It is the first in a series of early Chemical Substances Information Network (CSIN) capabilities. The pre-prototype will be followed by two phases of prototype development resulting in progressively more powerful minicomputer-based systems planned for late 1980 and late 1981.

PB80-178429 Not available NTIS
National Bureau of Standards, Washington, DC.
The Effect of Heating Rate Upon the Coupling of Complex Reactions. I. Independent and Competitive Reactions.
Final rept.,
J. H. Flynn. 1980, 14p
Sponsored in part by Naval Air Systems Command, Washington, DC., and Office of Naval Research, Arlington, VA.
Pub. in Proceedings of North American Thermal Analysis Society Meeting (7th), St. Louis, MO, September 27, 1977, Thermochim. Acta 37, p225-238 1980.

Theoretical curves of the rate of conversion vs. temperature at constant heating rate for first-order reactions with activation energies of 80, 160, 240 and 320 kJ/mole are compared over a range of heating rates from 10 to the -9 power to 10 to the 5th power K/s for independent and competitive reactions. Independent reactions with different activation energies may be separated from one another by either increasing or decreasing the rate of heating. The spectrum of derivative peaks for two competing reactions at various heating rates has a dispersion effect in the region of change from low to high activation energy reactions. The practical range of heating rates in thermal analytical experiments and the application of these model cases to the understanding of the kinetics of complex systems at high and low temperatures are discussed.

PB80-178452 PC A03/MF A01
TRW Defense and Space Systems Group, Redondo Beach, CA.
Quality Assurance of Fluidized-Bed Combustion (FBC) H2SO4 Measurements.
Final rept. May 77-Aug 78,
T. R. Acciani, and R. F. Maddalone. Jul 79, 35p EPA-600/7-79-154
Contract EPA-68-02-2613

The report gives results of a study to: evaluate existing data on H2SO4 measurements from flu-

dized-bed combustion (FBC) processes; determine the true value of the H2SO4 concentration which might have been obtained had the control condensation (Goksoyr/Ross) procedure been used; and run a material compatibility study to find alloys that can be used to fabricate a controlled condensation sampling system. The sampling system at Exxon's FBC facility was reviewed. H2SO4 values are about 12% low with another reduction of 10-25% because of low sampling temperatures and Balstron filters. The control condensation system with an acid/base titration using bromophenol blue as the indicator is the recommended sampling/analysis method for H2SO4 sampling at the Exxon facility. Construction material for the controlled condensation system can be 316L stainless steel, which had the best performance when subjected to various tests used to simulate an FBC environment and will easily withstand the pressures found at the Exxon facility.

PB80-178718 Not available NTIS
Scripps Institution of Oceanography, La Jolla, CA.
Deoxosarcophine from a Soft Coral, 'Sarcophyton' sp.
James M. Frincke, Douglas E. McIntyre, and D. John Faulkner. c1980, 5p
Grant NOAA-04-6-158-44110
Pub. in Tetrahedron Letters, v21 p735-738 1980.

A sample of deoxosarcophine was converted into sarcophine by autoxidation. Two reactions are described that will enable the enantiomers of deoxosarcophine to be interrelated. (Copyright (c) Pergamon Press Ltd. 1980.)

PB80-180003 MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Tunable Laser Survey of Molecular Air Pollutants: Doppler-Limited Spectra of the C-H Stretching Bands of Formaldehyde, Ethylene, Ethane and Allene.
Final rept.,
A. S. Pine. Jan 80, 145p NSF/RA-800011
Grant NSF-DAR78-24562
Available Microfiche only because of poor quality.

High resolution (Doppler-limited) near-infrared spectra of several hydrocarbons and other light molecules of atmospheric significance were surveyed and catalogued using a unique difference-frequency laser spectrometer. Such spectra can be applied to the detection, identification, and quantitative monitoring of molecular air contaminants using lasers or other high-resolution spectroscopic instruments. Presented here are the complete Doppler-limited spectra of the complex and rich C-H stretching bands of formaldehyde (H2CO), ethylene (C2H4), ethane (C2H6), and allene (C3H4). Precise frequencies and intensities of the spectral lines also are listed in an atlas for each molecule along with assignments, made by several collaborators, for most of the observed transitions.

PB80-180334 Not available NTIS
National Bureau of Standards, Washington, DC.
Experimental Investigation of Plasma-Broadened Hydrogen Balmer Lines at Low Electron Densities.
Final rept.,
H. Ehrich, and D. E. Kelleher. Jan 80, 16p
Pub. in Phys. Rev. A 21, n1 p319-334 Jan 80.

The central regions of the plasma-broadened Balmer lines H(alpha), H(beta), and H(gamma) have been measured in a wall-stabilized arc over an electron density range between approximately 4 x 10 to the 14th power and 2 x 10 to the 16th power/cc. Results are presented.

PB80-180342 Not available NTIS
National Bureau of Standards, Washington, DC.
Microanalytical Techniques with Inverted Solid State Ion-Selective Electrodes. I. Nanoliter Volumes.
Final rept.,
G. L. Vogel, L. C. Chow, and W. E. Brown. Feb 80, 3p
Grant PHS-DE-04385
See also Volume 2, PB80-180359. Prepared in cooperation with American Dental Association, Chicago, IL.
Pub. in Anal. Chem. 52, n2 p375-377 Feb 80.

A procedure is described for measuring the fluoride concentration in nanoliter sample volumes deposited on the surface of an inverted commercial fluoride electrode, using a reference microelectrode maneuvered into contact with the specimen via a micromanipulator. This technique permits the fluoride concentration of the microvolume to be measured with an accuracy approaching that of a conventionally used electrode. Since many specimens can be equilibrated simultaneously on the surface of the electrode, this method is rapid (20-30 specimens per hour). Furthermore, the technique may be used with other solid state electrodes.

PB80-180359 Not available NTIS
National Bureau of Standards, Washington, DC.
Microanalytical Techniques with Inverted Solid State Ion-Selective Electrodes. II. Microliter Volumes.
Final rept.,
G. L. Vogel, and W. E. Brown. Feb 80, 3p
Grant PHS-DE-04385
See also Volume 2, PB80-180342. Prepared in cooperation with American Dental Association, Chicago, IL.
Pub. in Anal. Chem. 52, n2 p377-379 Feb 80.

The authors reported recently (1) how a commercial solid state electrode may be adapted for microvolumes by bringing a glass microreference electrode into contact with hemispherical microdrops of specimen deposited under mineral oil on the surface of the electrode mounted in an inverted position. While this method is fast (20 to 30 specimens per hour), and although specimens of microscopic size can be determined (300 pL and less), it is somewhat elaborate for routine laboratory use with specimens of 1 to 5 microliters. In this paper the authors describe a simple device that will, in a few minutes, adapt most solid state electrodes for the rapid determination of samples in this volume range.

PB80-180375 Not available NTIS
National Bureau of Standards, Washington, DC.
Absolute Photoabsorption Cross Section of Core Excited Electrons in Lithium Vapor.
Final rept.,
G. Mehlman, D. L. Ederer, E. B. Salmon, and J. W. Cooper. 1978, 3p
Pub. in Proc. Int. Conf. on X-Ray and XUV Spectroscopy, Sendai, Japan 1978, Jpn. J. Appl. Phys. 17, Suppl. 17-2, p167-169 1978.

The photoabsorption cross section of lithium vapor has been measured between 200 and 172 A using a heat pipe absorption cell with aluminum windows. An average cross section of about 2 Mb was observed in this region. Preliminary estimates indicate that 70% of the ions produced are in the 1s2s singlet triplet S states. The resonance structure in this region, which is compatible with earlier work, is discussed.

PB80-180946 PC **A09**/MF **A01**
Illinois Univ. at Urbana-Champaign. Water Resources Center.
Transport Processes of Particles in Non-Dilute Suspensions in Turbulent Water Flow, Phase I: Experimental Measurements.
Research rept. (Final),
Barcaly G. Jones, and John E. Gronager. Mar 80, 191p UILU-WRC-80-0148, W80-04866, OWRT-A-085-ILL(1)
Contract DI-14-34-001-8015

In many engineering disciplines, problems arise with regard to particulate matter suspended in turbulent fluids. Unfortunately, due to the inherent complexity of transport in turbulent flows, a unified theory has not yet been realized. Previous research has provided an analytical model, as well as experimental data, for particle behavior in very dilute turbulent suspension; where the particles' presence did not greatly alter the turbulent structure, nor did particle-particle interactions come into play. As a logical extension of the previous research this project was undertaken to examine the behavior of particles in a non-dilute turbulent suspension.

PB80-181936 PC **A03**/MF **A01**
Environmental Monitoring Systems Lab., Research Triangle Park, NC. Quality Assurance Div.
An Evaluation Study of EPA Method 8.
Final rept.,
Joseph E. Knoll, and M. Rodney Midgett. Mar 80, 44p EPA-600/4-80-018

Techniques used in EPA Method 8, the source test method for acid mist and sulfur dioxide emissions from sulfuric acid plants, have been evaluated. Evidence is shown that trace amounts of peroxides in isopropyl alcohol result in the conversion of sulfur dioxide to sulfate and cause positive errors in acid mist values. Methods for measuring and purifying IPA are described. No conversion of sulfur dioxide to sulfate on filters or filter supports were observed. Collection efficiencies of train components are described and two alternate indicators are evaluated. Solid ammonium sulfates's use as audit samples is discussed. Field testing is also described in which paired-probe techniques were employed. They showed that, when sulfur trioxide is absent from the effluent streams, acid mist is efficiently collected by a single filter, even when the isopropyl alcohol-containing impinger is eliminated. Both ammonia and dimethyl analine, which are employed as gas scrubbers, cause sulfur dioxide to be retained in the isopropyl alcohol and result in large positive interferences in acid mist values. Ferric oxide, present in the effluents of steel pickling operations, causes a large negative interference in acid mist values.

PB80-182090 PC **A06**/MF **A01**
Membrane Systems, Inc., San Diego, CA.
Development of Reverse Osmosis Membrane for Seawater Desalination.
Final rept.,
Richard G. Sudak, James B. Bott, Ronald L. Fox, Susan J. Gagner, and Max E. McKee. Sep 79, 118p W80-04802, OWRT-C-80278-S-(8523)(1)
Contract DI-14-34-0001-8523

Composite reverse osmosis membranes were formed with a polysulfone porous substrate. The membrane barrier layer was formed on this substrate by the interfacial polycondensation of polyethylenimine and isophthaloyl chloride. The barrier layer was shown to be capable of single stage seawater desalination in that selected membrane samples had a flux of 17 GFD and a rejection of 99% when operated on a feed-water containing 35,000 mg/l of sodium chloride at 800 psig and 75F. Manufacturing yields of this membrane would be expected to be low due to the poor quality of fabric carrier material which is available. Asymmetric polyimide membrane was developed further by optimization of casting formulations and conditions. When tested under seawater conditions as described above, the best results obtained were 5.8 GFD and 98.4% rejection. A composite membrane barrier layer was formed on polysulfone substrate interfacially with poly(epichlorohydrin-secondary diamines) and isophthaloyl chloride. The best results obtained with this membrane under seawater conditions were 9.6 GFD and 94% rejection.

PB80-182298 Not available NTIS
National Bureau of Standards, Washington, DC.
Spectrum and Energy Levels of Twelve-Times Ionized Niobium (Nb XIII).
Final rept.,
J. Reader, and N. Acquista. Mar 80, 5p
Sponsored in part by Department of Energy, Washington, DC. Div. of Magnetic Fusion Energy.
Pub. in Jnl. Opt. Soc. Am., v70 n3 p317-321 Mar 80.

The spectrum of Nb XIII was observed with a low-inductance spark and a laser-produced plasma in the region from 70-630 A on the 10.7-m grazing incidence spectrograph at NBS. From the identification of 38 lines, a system of 29 energy levels was determined. The level system (Cu I isoelectronic sequence, 3d(10)nl) includes the series ns(n = 4-6), np(n = 4-7), nd(n = 4-6), nf(n = 4-7), and ng(n = 5-8). The observed energy levels are compared with Hartree-Fock calculations. The ionization energy is determined from the nf and ng series.

RFP-2980 PC **A02**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Equilibria and Thermodynamic Properties of the Plutonium-Hydrogen System.
J. M. Haschke, A. E. Hodges, III, C. M. Smith, and F. L. Oetting. 1980, 15p CONF-800402-2

Contract EY-76-C-04-3533
International symposium on the properties and applications of metal hydrides, Colorado Springs, CO, USA, 7 Apr 1980.

Equilibrium, kinetic and x ray diffraction data show the existence of two stability regimes in the Pu-H system. A metastable solid solution between CaF sub 2 -type PuH sub 1 sub 9 and anti-Fe sub 3 Al-type PuH sub 3 sub 0 forms at low temperature and behaves as an ideal solid solution. Equilibrium and calorimetric results show that the enthalpy of formation varies linearly from -38 to -50 kcal/mol between the lower phase boundary and the trihydride. The phase relationships established at high temperature are similar to those of the lanthanide difluoride-lanthanide trifluoride systems. A series of CaF sub 2 -related phases apparently forms between PuH sub 1 sub 9 and PuH sub 2 sub 5 ; a nonstoichiometric hexagonal (LaF sub 3 -type) hydride exists in the range PuH sub 2 sub 9 -PuH sub 3 sub 0 . A procedure for preparing pure hexagonal puH sub 3 sub 00 is described, and the hysteresis behavior of the Pu-H system is discussed. (ERA citation 05:016278)

SAND-80-0597C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Electron and Photon Stimulated Desorption.
M. L. Knotek. 1980, 12p CONF-800317-2
Contract EY-76-C-04-0789
American Physical Society meeting, New York, NY, USA, 24 Mar 1980.

Stimulated desorption is investigated as a way to examine surface properties of materials. (ERA citation 05:016976)

SERI/RR-334-550 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Design for a Gas Chromatograph for Characterizing Desiccant Material.
R. Pitts, and A. Czanderna. Feb 80, 37p
Contract EG-77-C-01-4042

To characterize solar desiccant cooling materials, a gas chromatograph has been designed. The chromatograph can record breakthrough curves and equilibrium data under widely varying conditions so that the rates and heats of sorption may be determined. This information may then be used in analyzing models for the construction of desiccant cooling systems which use solar heating for the drying cycle. The effects of desiccant geometry upon bed packing are minimal. However, the effects of desiccant geometry upon the pressure differential across the bed and upon the rate controlling processes may be strong, and these must be investigated thoroughly. Ranges for flow rates and for control of the physical parameters have been selected to encompass those that may be encountered in practical systems. A list of equipment and materials of construction is presented together with a brief description of the operation of the equipment. (ERA citation 05:015390)

UCID-18489 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Summary and Review of Hydrogen Theoretical Equation-of-State Models at Lawrence Livermore Laboratory.
H. C. Graboske, Jr., and K. L. Wong. 1 Feb 80, 39p
Contract W-7405-ENG-48

A review and analysis of the hydrogen equations of state (EOS) at use at Lawrence Livermore Laboratory (LLL) are presented. Careful comparisons to experimental data and among EOS's are performed and evaluated. The new LLL hydrogen EOS (EOS95) and its representations produce the best agreement with experimental data and hydrodynamic simulation studies. (ERA citation 05:016977)

7E. Radio and Radiation Chemistry

BARC-974 PC **A05**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Radiochemistry Division Annual Progress Report for 1976.
R. H. Iyer. 1978, 96p
U.S. Sales Only.

An account of the work done in the Radiochemistry Division of the Bhabha Atomic Research Centre, Bombay, during the calendar year 1976 is given. Some of the major highlights are: (1) development of a technique LEADTRAP using lead as a tracer for determination of total uranium and plutonium in the accountability tank in the fuel reprocessing plants, (2) fabrication of a compact unit of each gamma absorptiometer, the acidity monitor and the calorimeter for in-line monitoring of fuel reprocessing streams, (3) design and fabrication of an annular neutron counter, and (4) participation in the international intercomparison experiments PAFEX-II for the determination of plutonium in dissolver solutions and the processing of Ge(Li) gamma spectra, both organised by the IAEA. (Atomindex citation 10:493762)

BARC-982 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Formation of Secondary Amine in the Radiolysis of Trilaurylamine.
P. K. Bhattacharyya, R. Veeraraghavan, and P. B. Ruikar. 1978, 7p
U.S. Sales Only.

The yield of secondary amine (R sub 2 NH) in the gamma radiolysis of trilaurylamine (TLA) under various conditions has been determined spectro-photometrically. In the radiolysis of TLA-benzene system, the G(R sub 2 NH) has been found to increase linearly with the concentration of TLA, ultimately reaching a value of 4 for pure TLA. The mechanism of R sub 2 NH formation has been explained through the cleavage of C-N bond and subsequent hydrogen abstraction reaction of R sub 2 N radical intermediate. In the case of acid equilibrated solution of TLA in benzene, it has been found that the protonation of TLA inhibits R sub 2 NH formation whereas, in the presence of nitrate small amounts of R sub 2 NH is formed. The results are discussed. (Atomindex citation 10:481745)

CEA-CONF-4380 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Grenoble (France).
Porous Materials Consolidation by Impregnation of a gamma Rays Polymerized Styrene-Polyester Resin.
Regis Ramiere. 1978, 6p
In French.
U.S. Sales Only.

Complementary indications on some characteristics of the 'impregnation-gamma rays irradiation' process applied to limestone were given at the exhibition of the motion-picture NUCLEART. Parameters intervening in homogeneity improvements of the impregnated zone and thermal expansion coefficient of treated stones are described. (Atomindex citation 10:481735)

JAERI-M-7875 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Effects of Electron Beam Irradiation on Gas Mixture of Carbon Monoxide and Hydrogen in the Presence of Solid Catalysts.
Siro Nagai, Koji Matsuda, Hidehiko Arai, and Motoyoshi Hatada. Oct 78, 75p
In Japanese.
U.S. Sales Only.

Considering that radiation chemistry may contribute to solve the future problem of chemical resources, studies have been carried out to find how radiation chemistry plays a role in synthesizing organic raw materials for future chemical industries from carbon monoxide and hydrogen. The studies are in two projects; radiation chemical reaction of the mixture in gas phase, and the same with solid catalyst in which we have participated since fiscal 1975. This report describes the studies over the past three years on the radiation chemical reactions of carbon monoxide and hydrogen in the presence of various solid catalysts. The catalysts studied were Fe-Cu catalyst supported on diatomaceous earth (Fischer-Tropsch catalyst), silica gel, graphite, Ag, and chromia-zinc oxide. The presence of Fischer-Tropsch catalyst, whose effects were studied in most detail, proves to favor the hydrogenation reaction of olefins produced catalytically, and of aldehydes produced radiation chemically in gas phase. Studies on the other solid catalysts revealed that silica gel exhibits catalytic selectivity for the reaction producing hydrocarbons and that there exist solids entirely inactive to radiation chemical reaction of the gas mixture. (Atomindex citation 10:481730)

JAERI-M-7896 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Irradiation Effects on the Reaction of Mixture of Carbon Monoxide and Hydrogen, 1.
Shun-ichi Sugimoto, Masanobu Nishii, and Toshio Sugiura. Oct 78, 69p
In Japanese.
U.S. Sales Only.

Whether or not a radiation chemical method is useful for obtaining chemical raw materials from carbon monoxide and hydrogen in future chemical industries has been studied. the experimental results of the radiation chemistry studies of the above gas mixture from April 1974 through October 1976 are described. Irradiation was made with an electron beam from a Van de Graaff electron accelerator, using a stainless-steel 7-liter irradiation vessel equipped with a titanium irradiation window 30 mu m thick, under pressures up to 1000 Torr. A variety of oxygen-containing products could be observed such as formaldehyde, acetaldehyde, trioxane, tetraoxane, methanol, formic acid, acetic acid, methyl formate, glyoxal, and carbon suboxide, and hydrocarbons like methane. Yields and G values of the products were determined for various reaction conditions such as composition, additive, pressure, and temperature of the mixture, and irradiation conditions such as electron accelerating voltage, beam current, and irradiation time. An experiment was also made on the system containing ammonia as an additive, to reveal precursors of the oxygen-containing products. (Atomindex citation 10:481737)

PB80-181084 PC **A06**/MF **A01**
Systems Applications, Inc., San Rafael, CA.
Modeling of Simulated Photochemical Smog with Kinetic Mechanisms. Volume 2. CHEMK: A Computer Modeling Scheme for Chemical Kinetics.
Final rept. Jul 78-Sep 79,
G. Z. Whitten, and H. Hogo. Feb 80, 115p EF78-107R, EPA-600/3-80-028B
Contract EPA-68-02-2428
See also PB80-175102, and PB-290 508.

Mechanisms that describe the formation of photochemical smog are developed using a computer modeling technique directed toward the simulation of data collected in two smog chambers: an indoor chamber and a dual outdoor chamber. Individual compounds for which specific experiments were simulated and mechanisms developed include the following: formaldehyde, acetaldehyde, ethylene, propylene, butane, and toluene. Volume 2 contains the user's manual and coding for a chemical kinetics computer program, CHEMK.

PB80-181274 PC **A10**/MF **A01**
North Carolina Univ. at Chapel Hill. School of Public Health.
Photochemical Study of NOx Removal from Stack Gases.
Final rept. Jan 77-Mar 79,
John R. Richards, and Donald L. Fox. Mar 80, 202p EPA/600/7-80/038
Grant EPA-R-804740

The report gives results of an evaluation of the technical feasibility of a photochemical pretreatment system for NOx control at coal-fired boilers. The approach utilizes reaction mechanisms similar to those responsible for photochemical oxidant incidents. The reactions are initiated under controlled conditions while the pollutants are at high concentration and while the reaction products can be removed. Results indicate that, under time- and light-limited conditions, it is possible to quench the photochemical reactions at the NO2 peak and prior to the formation of ozone, aerosols, and other secondary products. Photochemical oxidation of NO was insensitive to SO2 concentration and CO2 concentration. The photochemical system appears compatible with conditions resulting from combustion modifications to suppress NOx generation.

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

AD-A083 672/6 PC **A02**/MF **A01**
Woods Hole Oceanographic Institution MA
Diel Vertical Migration by Salpa aspera and its Potential for Large-Scale Particulate Organic Matter Transport to the Deep Sea,
P. H. Wiebe, L. P. Madin, L. R. Haury, G. R. Harbison, and L. M. Philbin. 11 May 79, 13p Rept nos. WHOI-79-102, WHOI-CONTRIB-4000
Contracts N00014-66-C-0241, N00014-74-C-0262
Pub. in Marine Biology, v53 p249-255 1979. Sponsored in part by Grants NSF-OCE73-39976, NSF-OCE75-21715 and NSF-DES74-02783A01.

No abstract available.

LBL-8945 PC **A04**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Ocean Thermal Energy Conversion Ecological Data Report from OSS Researcher in Gulf of Mexico, (GOTEC-01), July 12-23, 1977.
M. S. Quinby-Hunt. Jun 79, 60p
Contract W-7405-ENG-48

Ecological measurements important for environmental assessment of the effect of an operating Ocean Thermal Energy Conversion plant were initiated in July 1977 at the proposed Gulf of Mexico site off the coasts of Louisiana, Mississippi, Alabama and Florida. The initial cruise of the OSS Researcher, in a joint effort with the Atlantic Oceanic and Meteorological Laboratories (AOML) of the National Oceanic and Atmospheric Administration (NOAA), and Lawrence Berkeley Laboratory (LBL) took place from 12 to 23 July 1977. The measurements were taken at 15 oceanographic stations to a maximum depth of 1000 m. Water was analyzed for trace metals, nutrients and chlorophyll a and ATP. Physical data, salinity and dissolved oxygen measurements were supplied by NOAA-AOML. Two bioassays were carried out using indigenous phytoplankton to estimate the effect of deep water on the rates of exp 14 CO sub 2 uptake of photic zone algae. The Deep Scattering Layer (DSL) was monitored at the site by a continuously recording 12 kHz depth sounder at the Mobile site. This report presents data collected during the cruise. (ERA citation 05:015317)

PB80-176910 PC **A03**/MF **A01**
Point Reyes Bird Observatory, Stinson Beach, CA.
Haul Out Patterns of Harbor Seals in Bolinas Lagoon, California.
Final rept.,
Sarah G. Allen, David G. Ainley, and Gary W. Page. May 80, 37p MMC-78/10
Contract MM8AC012

Harbor seals (Phoca vitulina) frequent several areas along the Marin County coast of California. At one of these, Bolinas Lagoon, they haul out on two sites, Kent and Pickleweed Islands, year round. Other tidal flats are used infrequently. From this effort the authors gathered information on the non-human and human related factors that affect the haul out patterns of harbor seals.

PB80-176928 PC **A04**/MF **A01**
New England Aquarium, Boston, MA.
Review of the Harbor Porpoise 'Phocoena phocoena' in the U.S. Northwest Atlantic.
Final rept.,
John H. Prescott, and Patricia M. Fiorelli. May 80, 67p MMC-78/08
Contract MM8AC016

A review of existing published and unpublished information reveals that little is known of the abundance of harbor porpoise (Phocoena phocoena) in the U.S. Northwest Atlantic. Some of the information indicates that the species may be declining in the southern limits of its range and that the population is more stable in its northern portion. Harbor porpoise is the smallest oceanic cetacean, is relatively short-lived, has a high rate of metabolism and, unlike other cetaceans, has an apparent onshore-offshore seasonal migratory pattern. The harbor porpoise matures at approximately four years of age. There is a need for additional information to determine the effects of human action on the species.

PB80-177462 PC **A99**/MF **A01**
Center for Natural Areas, South Gardiner, ME.
A Summary and Analysis of Environmental Information on the Continental Shelf from the Bay of Fundy to Cape Hatteras (1977). Volume I. Book I. Chapters I-V.
Final rept. 1972-77.
6 Dec 77, 879p BLM/YL-SR-77/01
Contract DI-AA550-CT6-45
See also Volume 1, Book 2, PB80-177470.

The Literature survey analyzes published, unpublished, and raw data from 1972 to 1977. Topics presented in the report are geology (nearshore and offshore), meteorology, physical oceanography, chemistry (hydrocarbons, trace metals, nutrients, pesticides, and radioactivity), phytoplankton, zooplankton, neuston, nekton, benthos, commercial fisheries, sport fisheries, benthic flora, marine mammals, marine birds, threatened or endangered species, microbiology, OCS uses, unique and endangered environments, and toxicity.

PB80-177470 PC **A99**/MF **A01**
Center for Natural Areas, South Gardiner, ME.
A Summary and Analysis of Environmental Information on the Continental Shelf from the Bay of Fundy to Cape Hatteras (1977). Volume 1. Book 2. Chapters VI-XIV.
Final rept. 1972-77.
6 Dec 77, 783p BLM/YL-SR-77/02
Contract DI-AA550-CT6-45
See also Volume 1, Book 3, PB80-177488.

The Literature survey analyzes published, unpublished, and raw data from 1972 to 1977. Topics presented in the report are: phytoplankton, zooplankton, neuston, nekton, benthos, commercial fisheries, sport fisheries, benthic flora, marine mammals, or marine birds.

PB80-177488 PC **A99**/MF **A01**
Center for Natural Areas, South Gardiner, ME.
A Summary and Analysis of Environmental Information on the Continental Shelf from the Bay of Fundy to Cape Hatteras (1977). Volume 1. Book 3. Chapters XV-XX.
Final rept. 1972-77.
6 Dec 77, 990p BLM/YL-SR-77/03
Contract DI-AA550-CT6-45
See also Volume 2, PB80-177496.

The Literature survey analyzes published, unpublished, and raw data from 1972 to 1977. Topics presented in the report are geology (nearshore and offshore), meteorology, physical oceanography, chemistry (hydrocarbons, trace metals, nutrients, pesticides, and radioactivity), phytoplankton, zooplankton, neuston, nekton, benthos, commercial fisheries, sport fisheries, benthic flora, marine mammals, marine birds, threatened or endangered species, microbiology, OCS uses, unique and endangered environments, and toxicity.

PB80-177496 PC **A22**/MF **A01**
Center for Natural Areas, South Gardiner, ME.
A Summary and Analysis of Environmental Information on the Continental Shelf from the Bay of Fundy to Cape Hatteras (1977). Volume II. Master Bibliography, Index, Acknowledgements.
Final rept. 1972-77.
6 Dec 77, 516p BLM/YL-SR-77/04
Contract DI-AA550-CT6-45
See also Volume 3, PB80-177504.

The Literature survey analyzes published, unpublished, and raw data from 1972 to 1977. Topics presented in the report are geology (nearshore and offshore), meteorology, physical oceanography, chemistry (hydrocarbons, trace metals, nutrients, pesticides, and radioactivity), phytoplankton, zooplankton, neuston, nekton, benthos, commercial fisheries, sport fisheries, benthic flora, marine mammals, marine birds, threatened or endangered species, microbiology, OCS uses, unique and endangered environments, and toxicity.

PB80-177504 PC **A22**/MF **A01**
Center for Natural Areas, South Gardiner, ME.
A Summary and Analysis of Environmental Information on the Continental Shelf from the Bay of Fundy to Cape Hatteras (1977). Volume III. Appendix A, B, and C.
Final rept. 1972-77.
6 Dec 77, 511p BLM/YL-SR-77/05
Contract DI-AA550-CT6-45
See also Volume 1, Book 2, PB80-177462.

The Literature survey analyzes published, unpublished, and raw data from 1972 to 1977. Topics presented in the report are geology (nearshore and offshore), meteorology, physical oceanography, chemistry (hydrocarbons, trace metals, nutrients, pesticides, and radioactivity), phytoplankton, zooplankton, neuston, nekton, benthos, commercial fisheries, sport fisheries, benthic flora, marine mammals, marine birds, threatened or endangered species, microbiology, OCS uses, unique and endangered environments, and toxicity. The literature review also identifies data gaps and recommends studies to fill those gaps.

PB80-178197 PC **A04**/MF **A01**
Point Reyes Bird Observatory, Stinson Beach, CA.
Studies of Marine Mammals at the Farallon Islands, California, 1976-1979.
Final rept.,
Harriet R. Huber, David G. Ainley, Stephen H. Morrell, Robert J. Boekelheide, and R. Philip Henderson. May 80, 52p MMC-78/11
Contract MM1300888-2
See also report dated Nov 79, PB80-111602.

Observations of pinnipeds and cetaceans on or near the South Farallon Islands are reported for the tenth consecutive year, the fifth consecutive year under contract to the Marine Mammal Commission and the first year under contract to the National Marine Fisheries Service. Five species of pinnipeds and three of cetaceans were censused and observed from 1 September 1978 to 31 August 1979. The peak number of gray whales was seen the last week in December with an average of 14.9 animals per day migrating south. Fifteen Steller (northern) sea lion pups were born between April 17 and July 12. The highest count of harbor seals was 33 on 19 July. Only one pup was seen during pupping season. A high count of 776 elephant seals was recorded during the spring molt (an increase of 5% over the previous spring).

PB80-181845 PC **A05**/MF **A01**
Woods Hole Oceanographic Institution, MA.
Biological and Hydrographic Station Data Obtained in the Vicinity of Nantucket Shoals, May 1978 - May 1979,
R. Limeburner, R. C. Beardsley, and W. Esaias. Jan 80, 92p WHOI-80-7, NOAA-80041103
Grants NOAA-04-7-158-44104, NOAA-04-9-M01-149
Prepared in cooperation with State Univ. of New York at Stony Brook. Marine Sciences Research Center.

Six cruises were made from May 1978 to May 1979, to measure the regional distributions of chlorophyll, silicate, nitrate and nitrite, phosphate, temperature, and salinity in the vicinity of Nantucket Shoals on the New England continental shelf. A summary of the hydrographic observations made on the first three cruises has already been presented in Limeborner and Beardsley (1979). A summary of the biological data obtained on five of the six cruises and the hydrographic observations made during the last three cruises is presented here in graphic form.

PB80-183379 PC **A03**/MF **A01**
Environmental Research Lab., Gulf Breeze, FL.
Marine and Estuarine Pollution.
Journal article (Final),
Donald Reish, Steven S. Rossi, A. J. Mearns, and Frank G. Wilkes. Jun 79, 43p EPA-600/J-79-079
Pub. in Journal of Water Pollution Control Fed. 51(6) p1477-1517 Jun 79. Prepared in cooperation with California State Univ., Long Beach., Scripps Institution of Oceanography, La Jolla, CA., and Southern California Coastal Water Research Project, El Segundo.

This literature review summarizes current data on the effects of pesticides on marine organisms,

aquatic environmental research methods, bioaccumulation of pesticides by estuarine and marine organisms, and biota residue. Results of studies of the environmental effects of dredging and the occurrence of diseases and tissue abnormalities in fish, shellfish, and marine plants also are reported.

PB80-184674 PC **A02**
Scripps Institution of Oceanography, La Jolla, CA.
Metabolites of the Marine Sponge 'Dercitus sp.',
Peter Djura, and D. John Faulkner. c1980, 4p
NOAA-80042205
Grant NOAA-04-6-158-44110
Pub. in Jnl. of Organic Chemistry, v45 p735-737 1980.

The isolation and identification of the related compounds 2'-de-N-methylaplysinopsin and 6-bromo-2'-de-N-methylaplysinopsin are described. The marine sponge Dercitus sp. was collected at Lighthouse Reef, Belize, and stored in methanol for 6 months. Soxhlet extraction of the sponge with methanol produced a brownish yellow extract which was fractionated on a Sephadex LH-20 column to yield aplysinopsin (2.7% dry weight) as the major metabolite.

PB80-185374 PC **A02/MF A01**
Environmental Research Lab.-Duluth, MN.
Temperature-Monitoring and Safety-Control Device,
Armond E. Lemke, and Walter F. Dawson. 1 Mar 79, 2p EPA-600/J-79-076
Pub. in Progressive Fish-Culturist, v41 n3 p165-166 Jul 79.

A two channel (sensitive) temperature monitor is described, and a parts list and wiring diagram are given. This equipment can be used as a safety shut-off or alarm system, or both. The sensitivity is 0.3C.

PB80-187297 PC **A02**
Georgia Univ., Athens.
Seasonal Patterns of CO2 and Water Vapor Exchange of Three Salt Marsh Succulents,
Ann E. Antifinger, and E. L. Dunn. c1979, 14p
NOAA-80041405
Grants NOAA-04-5-158-4, NSF-DEB77-06632
Pub. in Oecologia (Berl.), v43 p249-260 1979. Also pub. as Georgia Univ., Sapelo Island. Marine Inst. Contrib. No. 391. Prepared in cooperation with Harvard Univ., Cambridge, MA. and Georgia Inst. of Tech., Atlanta.

Diurnal carbon dioxide exchange patterns of three salt marsh succulents, Borrichia frutescens, Batis maritima and Salicornia virginica, were determined on a seasonal basis in the marsh at Sapelo Island, Georgia. Year-round photosynthetic activity was observed in these species though winter rates of CO2 exchange were reduced. Net primary productivity, estimated using gas exchange techniques, agreed with previously reported harvest data. The role of light and temperature in the control of seasonal photosynthetic changes was investigated. A similar variation in light utilization with season was found in all three species, while seasonal temperature acclimation was species dependent. Less than 20% of fixed CO2 was lost through dark respiration in any of the species. Water use in the salt marsh succulents was found to be relatively inefficient. High rates of transpiration were observed both summer and winter in the succulents. The succulents were judged to be C3 plants on the basis of several criteria. (Copyright (c) by Springer-Verlag, 1979.)

PB80-187560 PC **A09/MF A01**
California State Dept. of Fish and Game, Long Beach.
Biological, Oceanographic, and Acoustic Aspects of the Market Squid, 'Loligo opalescens' Berry,
Conrad W. Recksiek, and Herbert W. Frey. 1978, 178p FISH BULL-169, NOAA-80042202
Prepared in cooperation with Moss Landing Marine Labs., CA.

This report describes the results of 3 years of research on the market squid, Loligo opalescens. Areas of study included spermatogenesis and oogenesis; age and growth; feeding dynamics and prey of market squid; marine fish, bird, and mammal predators of this species in Monterey Bay; assessment of total population size and structure (number of stocks), and possible morphological indicators of stocks; the properties of market squid with respect to acoustic identification and quantification; and the relationship of the availability of these species to the commercial fishery in relation to the physical oceanographic conditions in Monterey Bay.

PB80-189590 MF **A01**
New Jersey Dept. of Environmental Protection, Trenton. Div. of Fish, Game, and Shellfisheries.
Research and Inventory of Shellfish within Estuarine Systems of the Atlantic Coast of New Jersey.
Completion rept. Oct 76-Nov 79,
Thomas W. McCloy. Apr 80, 56p NOAA-80042306

Investigations of possible sampling vessels to be utilized in the shellfish inventory have been conducted. The development of criteria for the classification of clam habitat based upon associated molluscan species continued with the collection of over 600 samples. The Lakes Bay Hard Clam Relay was monitored for the second year to determine size structure of the population, recruitment, and standing stock and how these factors fluctuate in relation to harvest intensity. Based upon the lack of recruitment, decrease in harvest, decline in catch per effort it appears that the hard clam resource supporting the program is declining. All applications received for leased shellfish ground (on the Atlantic Coast) were investigated and classified according to their productivity as shellfish habitat.

8B. Cartography

AD-A083 660/1 PC **A02/MF A01**
Defense Mapping Agency Aerospace Center St Louis Air Force Station MO
A Standard for Symbology on Engineering Scale Maps,
Robert Paul Jacober, Jr. 18 Apr 80, 24p

Though many organizations have been studying the need for or emphasizing the need for a standard set of map symbols for large scale maps (1:240 to 1:4800), little to date has been done to develop a standardized legend. The main problems associated with producing a standard legend are: to provide a unique symbol for each feature, to be able to computer-program the symbols, to implement the standard once it is adopted, and the upkeep of the standard. These problems and their solutions are addressed in the presentation. The actual set of symbols and their development are presented in Chapter V of the forthcoming manual: 'Manual on Map Uses, Scales, and Accuracies for Engineering and Associated Purposes'. This manual is being prepared by the Committee on Cartographic Surveying, of the Surveying and Mapping Division, ASCE. (Author)

AD-A083 794/8 PC **A02/MF A01**
Defense Mapping Agency Aerospace Center St Louis Air Force Station MO Geopositional Dept
Analytical Plotters in Defense Mapping Agency,
David H. Alspaugh. Apr 80, 12p

Computer assisted stereoplotters and comparators have been in development and in use by DMA for many years. Use of this type of equipment has reached a reasonable state of maturity in the support of the DMA production programs. Application of this type of equipment in DMA exemplify its potential to aerial triangulation and compilation of relief and planimetry. Several of these applications are reviewed so as to emphasize the range of tasks that can be performed on computer assisted equipment given the proper software engineering. (Author)

AD-A084 007/4 PC **A06/MF A01**
Army Engineer Topographic Labs Fort Belvoir VA
Synthesis Guide for Cross-Country Movement. report Number 4 in the ETL series on Guides for Army Terrain Analysts.
Technical rept.,
Alexander R. Pearson, and Janet S. Wright. Feb 80, 101p Rept no. ETL-0220
Orignal contains color plates: All DTIC and NTIS reproductions will be in black and white.

This report provides step-by-step instructions for compiling a cross-country movement map from previously prepared factor overlays. The information on the factor overlays is combined, or synthesized, manually with or without the aid of a simple mathematical model. Three synthesis methods are given: (1) using a mathematical model; (2) using a mathematical model with a programable calculator (HP-97), and (3) using a qualitative, non-mathematical procedure. (Author)

E80-10104 PC **A02/MF A01**
Purdue Univ., Lafayette, IN.
Sampling for Area Estimation: A Comparison of Full-Frame Sampling with the Sample Segment Approach,
Marilyn M. Hixson, Marvin E. Bauer, and Barbara J. Davis. 1979, 9p NASA-CR-160479
Contract NAS9-14970
Pub. in Machine Processing of Remotely Sensed Data Symposium, p97-104 1979. Prepared in cooperation with Indiana Bell Telephone Co., Indianapolis.

The author has identified the following significant results. Full-frame classifications of wheat and non-wheat for eighty counties in Kansas were repetitively sampled to simulate alternative sampling plans. Evaluation of four sampling schemes involving different numbers of samples and different size sampling units shows that the precision of the wheat estimates increased as the segment size decreased and the number of segments was increased. Although the average bias associated with the various sampling schemes was not significantly different, the maximum absolute bias was directly related to sampling size unit.

E80-10105 PC **A02/MF A01**
Purdue Univ., Lafayette, IN. Lab. for Application of Remote Sensing.
Evaluation of Several Schemes for Classification of Remotely Sensed Data: Their Parameters and Performance.
Technical rept.,
Donna Scholz, Nancy Fuhs, Marilyn Hixson, and Tsuyoshi Akiyama. 1979, 15p LARS-TR-041279, NASA-CR-160478
Contract NAS9-15466

The author has identified the following significant results. Data sets for corn, soybeans, winter wheat, and spring wheat were used to evaluate the following schemes for crop identification: (1) per point Gaussian maximum classifier; (2) per point sum of normal densities classifier; (3) per point linear classifier; (4) per point Gaussian maximum likelihood decision tree classifier; Nd (5) texture sensitive per field Gaussian maximum likelihood classifier. Test site location and classifier both had a significant effects on classification accuracy of small grains; classifiers did not differ significantly in overall accuracy, with the majority of the difference among classifiers being attributed to training method rather than to the classification algorithm applied. The complexity of use and computer costs for the classifiers varied significantly. A linear classification rule which assigns each pixel to the class whose mean is closest in Euclidean distance was the easiest for the analyst and cost the least per classification.

8C. Dynamic Oceanography

AD-A083 654/4 PC **A07/MF A01**
Woods Hole Oceanographic Institution MA
Moored Acoustic Travel Time (ATT) Current Meters: Evolution, Performance, and Future Designs.
Technical rept.,
James R. McCullough, and Wilhelm Graeper. Dec 79, 126p Rept no. WHOI-79-92
Contract N00014-76-C-0197

New laboratory measurements and numeric model studies show the present folded-path ATT current meters are stable and sensitive, but are not well suited for mean flow observations in surface gravity waves. Alternate designs which reduce unwant-

ed wake effects are proposed. ATT flowmeter history, principles of acoustic flow sensors, mean flow near cylinders, and the need for linear flow sensors are reviewed.

AD-A083 671/8 PC **A02**/MF **A01**
Woods Hole Oceanographic Institution MA
Vertical Coherence of the Internal Wave Field from Towed Sensors,
Eli J. Katz, and Melbourne G. Briscoe. 15 Aug 78, 20p Rept nos. WHOI-79-101, WHOI-CONTRIB-4205
Contract N00014-74-C-0262, Grant NSF-OCE74-19608
Pub. in Jnl. of Physical Oceanography, v9 n3 p518-530 May 79.

No abstract available.

AD-A083 779/9 PC **A06**/MF **A01**
Scripps Institution of Oceanography La Jolla CA
Profiles of Velocity and Temperature near the Indian Ocean Equator. Revision,
R. A. Knox, and M. J. McPhaden. Mar 80, 101p
Rept no. SIO-REF-80-6
Contracts N00014-75-C-0152, N00014-69-A-0200-6006
Revision to Rept. no. SIO-REF-76-11, AD-A028 760.

Between January 1973 and May 1975, quasi-weekly vertical profiles of temperature and velocity were obtained near the equatorial island of Gan (00 deg 41 min S, 73 deg 10 min E) in the Central Indian Ocean. This report presents the profiles directly. One analysis of the data, treating the seasonal cycle of near-surface currents, has been published (Knox, 1976); others are in progress. (Author)

AD-A083 780/7 PC **A06**/MF **A01**
Scripps Institution of Oceanography La Jolla CA
Models of the Equatorial Ocean Circulation.
Doctoral thesis,
M. J. McPhaden. 1980, 125p
Contract N00014-75-C-0152

Equatorial ocean dynamics are investigated using analytical and simple numerical models. The steady circulation is first examined using a linear equatorial beta-plane formulation in which continuous density stratification is a key element. The basin is horizontally unbounded and forced by either winds or a surface temperature boundary condition. Two vertically diffusive models are proposed to examine the effects of different turbulence parameterizations. One is characterized by temperature dissipation proportional to temperature itself, the other has biharmonic friction proportional to a fourth derivative of velocity. Both lead to equations for the steady state that are in many ways analogous to the well-known equations governing equatorial wave motion. The analogies are exploited both in obtaining analytical solutions and in describing the flow dynamics.

AD-A083 877/1 PC **A02**/MF **A01**
Scripps Institution of Oceanography La Jolla CA
Dekameter Radar Observations of Ocean Wave Growth and Decay,
Robert H. Stewart, and Calvin Teague. 19 Feb 79, 20p
Contracts N00014-75-C-0356, N00014-75-C-0152
Pub. in Jnl. of Physical Oceanography, v10 n1 p128-143 Jan 80.

No abstract available.

DOE/EV/00889-6 PC **A02**/MF **A01**
Skidaway Inst. of Oceanography, Savannah, GA.
Continental Shelf Processes Affecting the Oceanography of the South Atlantic Bight. Progress Report, June 1, 1979-May 31, 1980.
L. P. Atkinson. 29 Feb 80, 9p
Contract AS09-76EV00889

Progress is reported on research conducted from June, 1979 to May, 1980 on various oceanographic aspects of the South Atlantic Bight. Research topics included: (1) A flashing model of Onslow Bay, North Carolina based on intrusion volumes; (2) A description of a bottom intrusion in Onslow Bay, North Carolina; (3) Detailed observations of a Gulf Stream spin-off eddy on the Georgia continental shelf; (4) Pelagic tar of Georgia and Florida; (5) A surface diaton bloom in response to eddy-forced upwelling; and (6) Hydrographic observations off Savannah and Brunswick, Georgia. (ERA citation 05:018025)

N80-22949/5 PC **A05**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
High Energy Benthic Boundary Layer Experiment (HEBBLE): Preliminary Program Plan and Conceptual Design.
K. Frewing. 15 Feb 80, 94p NASA-CR-163003, JPL-PUB-80-2
Contract NAS7-100
Sponsored in Part by Onr.

Deep sea processes of flow-sediment interaction, particularly the role of high energy ocean bottom current events in forming the seafloor topography, transporting material, and mixing the bottom of the water column are examined. A series of observations at and near the sea bottom, in water depths of 4 to 5 km, in areas of the western North Atlantic where high energy current events occur, include site surveys and physical reconnaissance to identify suitable areas and positions, and one or more six month experiments to investigate temporal and spatial variations of high energy events within the boundary layer and their interaction with the seabed. Descriptions of proposed HEBBLE activities are included, with emphasis on technology transfer to the oceanographic community through design, fabrication, testing, and operation of an instrumented ocean bottom lander.

PB80-187214 PC **A02**
Massachusetts Inst. of Tech., Cambridge. Dept. of Ocean Engineering.
Mechanics of a Restrained Layer of Floating Oil Above a Water Current,
Jerome H. Milgram, and Robert J. Van Houten.
cJul 78, 19p MITSG-80-4J, NOAA-80041402
Grant NOAA-04-6-158-44081
Pub. in Jnl. of Hydronautics, v12 n3 p93-109 Jul 78.

This paper determines the relative importance of interfacial shear stress and dynamic pressure in determining the thickness distribution of a layer of floating oil contained by a barrier above a water current. This is done by use of an equation relating vertical location of the oil-water interface, dynamic pressure, and shear stress. The interfacial shape is measured experimentally. The dynamic pressure is determined by numerical solution of the potential flow problem for flow beneath the measured shape. The aforementioned equation then yields the shear stress distribution. The rear portion of restrained oil layers are found to be governed by shear stress as are the forward portions for low current speeds. At higher current speeds, both dynamic pressure and shear stress are important in determining the shape of the forward portions. Large friction coefficients are shown to be due to flow over a rough interface resulting from the generation of Kelvin-Helmholtz waves on the interface. The entrainment of oil droplets into the water flow is shown to be the result of breaking of the Kelvin-Helmholtz waves. (Copyright 1978, by the American Institute of Aeronautics and Astronautics.)

PB80-811243 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Remote Sensing of the Ocean. Dynamics. 1970-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-May 80,
Robena J. Brown. Jun 80, 191p
Supersedes NTIS/PS-79/0586 and NTIS/PS-78/0584. Updates COM-73-11676.

The studies include remote sensing methods as they are applied to ocean currents, wind sediment transport, ocean waves, sea states, and air water interactions. The various techniques of measurement using radiometers, lasers, radar, and microwave and infrared equipment are described. (This updated bibliography contains 183 abstracts, 18 of which are new entries to the previous edition.)

8F. Geography

AD-A083 692/4 PC **A04**/MF **A01**
Resource Management Associates West Chester PA
Lake Erie Basin Land Resource Information System. Revision.
Final rept.,
Thomas H. Cahill. Jan 79, 69p
Contract DACW49-78-C-0040
Revision to reports dated 30 Sep 77 and 14 Dec 77.

This Final Report integrates and revises the initial LRIS Report dated 30 September, 1977 and the Technical Report dated 14 December, 1977. A great many changes have been made in various data files, codes and program formats during 1978 additions to the LRIS; please refer to the Users Manual and associated Appendices for any detailed information. This report is intended to give an overview of the LRIS, with the Users Manual providing a step by step guide through the various computer programs written during its development. In addition, selected applications and analyses using LRIS data are described in this report, while others are discussed in the Appendices to the Users Manual. (Author)

8G. Geology and Mineralogy

AD-A083 674/2 PC **A02**/MF **A01**
Woods Hole Oceanographic Institution MA
A Geophysical Survey within the Mesozoic Magnetic Anomaly Sequence South of Bermuda,
G. M. Purdy, and Kristin Rohr. 24 May 78, 16p
Rept nos. WHOI-79-104, WHOI-CONTRIB-4150
Contract N00014-74-C-0262
Pub. in Jnl. of Geophysical Research, v84 nB10 p5487-5496, 10 Sep 79.

No abstract available.

AD-A083 772/4 PC **A10**/MF **A01**
National Research Council Washington DC U S Geodynamics Committee
Continental Scientific Drilling Program.
Final rept. 1 May 78-30 Apr 79.
1979, 203p
Contract N00014-78-C-0501

The Workshop on Continental Drilling for Scientific Purposes addressed the questions of how to maximize the scientific value of current and planned continental drilling efforts of Federal agencies and industry and how to supplement these efforts with holes drilled solely for scientific purposes. The subjects treated by Workshop panels included: basement structures and deep continental basins - broad and specific questions related to understanding the earth's continental crust; thermal regimes - basic understanding of geothermal systems; mineral resources - basic understanding of ore-forming processes; earthquakes - basic understanding of earthquakes and faulting mechanisms; drilling technology - development of drilling and logging equipment capable of operating at high temperatures (up to 500 C).

AD-A083 953/0 PC **A03**/MF **A01**
Leschack Associates Ltd Silver Spring MD
Rapid Reconnaissance of Geothermal Prospects Using Shallow Temperature Surveys.
Final rept.,
Leonard A. LeSchack, John E. Lewis, and David C. Chang. Mar 80, 38p Rept no. TR-3
Contracts N00014-78-C-0535, DOE-EG-77-C-01-4021

In this final report, an Annual Wave Correction Model is constructed. The model makes rapid reconnaissance of geothermal prospects using shallow temperature surveys a reality. The model is tested using data previously obtained at the Coso KGRA. Inputs are surface meteorological data gathered during a 15 month period, soil thermal diffusivity data derived from previous studies in this series, and surface roughness and albedo measured at the site. Computations are made to determine the normal, i.e., non-anomalous temperatures at 2-m depth, for the period 22-24 September 1977, for each of the 102 stations at Coso. The

observed 2-m temperatures recorded at these stations during this period and corrected for elevation are compared to the normal temperatures, and a residual anomaly map has been drawn. The map compares favorably to the mean annual temperature map for the same area.

DOE/ET/28392-33 PC **A03**/MF **A01**
Utah Univ. Research Inst., Salt Lake City. Earth Science Lab.
Geology Map of the San Emidio, Nevada Geothermal Area.
J. N. Moore. Dec 79, 30p
Contract EG-78-C-07-1701

Since mid-Tertiary time, the rocks on the eastern edge of the San Emidio Desert have undergone extensive hydrothermal alteration. The most recent alteration has produced intense acid leaching and small native sulphur deposits along a steeply dipping range front fault. These deposits reflect the continued evolution of hydrogen sulfide from near-surface thermal fluids related to a presently active hydrothermal system. The absence of recent igneous activity, the close association between the thermal fluids and range front faults, and the limited distribution of active thermal features suggest that the thermal fluids represent deep circulation of meteoric water. (ERA citation 05:017614)

DOE/ET/28392-34 PC **A03**/MF **A01**
Utah Univ. Research Inst., Salt Lake City.
Geology of the Soda Lake Geothermal Area.
B. S. Sibbett. Dec 79, 39p
Contract EG-78-C-07-1701

The Soda Lake geothermal area is located in the Carson Desert, west-central Nevada. Hot springs activity has occurred in the Soda Lake area in the past, resulting in surface deposits which have motivated present geothermal exploration. The geothermal anomaly is in Quaternary clastic sediments which are as much as 4600 feet thick. The sediments consist of interbedded deltaic, lacustrine, and alluvial sediments. Quaternary basaltic igneous activity has produced cinder cones, phreatic explosions that formed the maar occupied by Soda Lake, and possible dikes. Opal deposition and soil alteration are restricted to a small area two miles north of Soda Lake. The location of hot springs activity and the surface thermal anomaly may be partially controlled by north-northeast-trending faults. (ERA citation 05:015483)

DOE/ET/28392-36 PC **A04**/MF **A01**
Utah Univ. Research Inst., Salt Lake City.
Geology and Alteration of the Baltazor Hot Springs and Painted Hills Thermal Areas, Humboldt County, Nevada.
J. B. Hulen. Dec 79, 68p
Contract EG-78-C-07-1701

The Baltazor Hot Springs KGRA and nearby Painted Hills thermal area are situated in Humboldt County, northwestern Nevada along the northwestern margin of the Basin and Range province. The oldest rocks exposed in the Baltazor area are eugeosynclinal metasedimentary and subordinate metavolcanic rocks of Permian to Triassic age intruded by Cretaceous diorite and quartz diorite. These are overlain by a thick volcanic and volcaniclastic sequence of Miocene through Pliocene age. Pre-Tertiary rocks are not exposed in the Painted Hills. Principal structures in the Baltazor area are intersecting high-angle normal faults which trend northerly and northwesterly. Quaternary landslides are dominant in the Painted Hills, although northerly- and northwesterly-trending high-angle faults are also present. Hydrothermal alteration and mineralization at Baltazor and in the Painted Hills are of several different styles and ages. Copper-bearing quartz veins in pre-Tertiary rocks antedate Cenozoic volcanism and sedimentation. The heat source for thermal phenomena and alteration in both areas is probably deep fault-controlled fluid circulation coupled with an abnormally high regional thermal gradient. (ERA citation 05:015484)

DOE/TIC-10284 PC **A07**/MF **A01**
Tennessee Univ., Knoxville.
Sodium-Calcium Ion Exchange on Clay Minerals at Moderate to High Ionic Strengths.
W. J. Rogers. Dec 79, 143p
Contract EY-76-C-05-0033
Thesis.

Sodium-calcium ion exchange on several clay minerals was studied at ionic strengths ranging from 0.01 to above 1.0. The minerals studied included attapulgite, illite, kaolin, and several montmorillonites. Distribution coefficients of calcium and sodium were obtained for the minerals over a wide range of solution conditions at pH five and equilibrium constants were calculated. The distribution coefficient of calcium, D/sub Ca/, was studied as a function of time, solution pH, loading, sodium concentration, and ionic strength fraction of sodium in constant ionic strength solutions. The distribution coefficient of sodium, D/sub Na/, was also studied as a function of time, loading, and sodium ionic strength fraction in constant total ionic strength solutions. Values of equilibrium constants calculated from distribution coefficients for solutions of constant ionic strength scattered bwteen 2 and 10 kg/kg for the montmorillonites and attapulgite while equilibrium constants for illite ranged from 5 to 10 kg/kg. No equilibrium constants for kaolin were calculated since distribution coefficients of sodium on this clay were too small to be measured. It was found that equilibrium constants at trace sodium loading were generally lower than those for higher sodium loadings by an order of magnitude or more due to the sensitivity of sodium distribution coefficients to the concentration of sodium in the clay at low loadings. Theoretical and experimental treatments of ion exclusion were included. (ERA citation 05:016246)

IDO-77.3.1 PC **A04**/MF **A01**
Utah Univ. Research Inst., Salt Lake City. Earth Science Lab.
Three Dimensional Magnetotelluric Modeling. Final: Volume 77-15.
G. W. Hohmann, and S. C. Ting. Jul 78, 54p
Contract EY-76-S-07-1601

A three-dimensional (3D) volume integral equation solution was refined and adapted to magnetotelluric (MT) modeling. The refinement, incorporating an integro-difference scheme, increases the accuracy somewhat without increasing the computer time. Utilizing the two symmetry planes for a plane wave source decreases the computer storage by a factor of 8 and greatly reduces the computer time. Convergence checks and comparisons with other solutions show that our results are valid. Because of space charges at resistivity boundaries, low-frequency 3D responses are much different from 1D and 2D responses. Hence 3D models are required for interpreting MT data in the complex geothermal environment. (ERA citation 05:017616)

PB80-177512 PC **E06**/MF **A01**
Geological Survey, Wood Hole, MA.
Environmental Geologic Studies in the Georges Bank Area, United States Northeastern Atlantic Outer Continental Shelf, 1975-1977.
Final rept.,
John M. Aaron. Feb 80, 180p BLM/YL/ES-80/01
See also PB80-177520.

Summary and synthesis of geological and chemical oceanographic studies conducted in the U.S. Northeastern Atlantic OCS (Georges Bank) for the period 1975-1977. The general objectives of the program are to: (1) measure the rate of sediment mobility over the seabed and monitor resultant changes in bottom morphology and texture; (2) determine the concentration, distribution, and flux of suspended particulate in the water column; (3) determine the vertical distribution of trace metals in the near-surface sediment at selected locations; and (4) evaluate potential hazards to oil and gas development due to surficial and intermediate depth structure and mass sediment-transport events.

PB80-177520 PC **A03**/MF **A01**
Geological Survey, Woods Hole, MA.
A Summary of Environmental Geologic Studies in the Georges Bank Area, United States Northeastern Atlantic Outer Continental Shelf, 1975-1977.
Executive summary (Final), 1975-77,
John M. Aaron. Feb 80, 27p BLM/YL/ES-80/02
See also PB80-177512.

Summary and synthesis of geological and chemical oceanographic studies conducted in the U.S. Northeastern Atlantic OCS (Georges Bank) for the period 1975-1977. The general objectives of the program are to: (1) measure the rate of sediment mobility over the seabed and monitor resultant changes in bottom morphology and texture; (2) determine the concentration, distribution, and flux of suspended particulate in the water column; (3) determine the vertical distribution of trace metals in the near-surface sediment at selected locations; and (4) evaluate potential hazards to oil and gas development due to surficial and intermediate depth structure and mass sediment-transport events.

USGS-474-307 PC **A04**/MF **A01**
Geological Survey, Denver, CO.
Preliminary Investigation of Physical-Properties Data from Pahute Mesa, Nevada Test Site, Using the GRASP Storage and Retrieval System.
G. E. Brethauer. Dec 79, 58p
Contract EY-76-A-08-0474

The GRASP (Geologic Retrieval and Synopsis Program) was used to select and calculate statistical parameters of physical-property data obtained from Pahute Mesa, Nevada Test Site, Nevada. Preliminary analysis of these data indicates that physical-properties values are not homogeneous throughout Pahute Mesa and do not vary linearly with direction or depth. 2 figures, 42 tables. (ERA citation 05:016923)

8H. Hydrology and Limnology

AD-A083 647/8 PC **A05**/MF **A01**
Naval Research Lab Washington DC
Great Lakes Wave Height Radar System.
Final rept. Nov-Dec 79,
Donald L. Hammond. 1 Nov 79, 97p USCG-D-6-80
Contract MIPR-Z-70099-7-817597-A

A study of the wave induced springing of the Great Lakes ore carrier M/V STEWART J. CORT is being done in two phases. Phase one is the installation, test and evaluation of a shipboard wave measurement system. Phase two is the measurement and correlation of the waves encountered by the vessel and the vessel's response. This report describes the wave measurement system and presents some of the test results. The wave measurement system consists of two radars used to profile the surface waves and two sets of accelerometers to record the motion of the vessel. Thirty-one data records, each about twenty to thirty minutes long, were recorded during the test period of phase one. Eight of these data sets were reduced to power spectral densities (PSD) in terms of the wave encounter frequencies. Each PSD value has about fifty degrees of freedom. The results show the significant wave height (SWH) as measured by the two radars to agree within about ten percent. The visual estimates of the SWH show a larger variation of agreement relative to the radar derived SWH. One buoy measurement was available to compare with the radar results. The buoy derived SWH (0.5m) was about one-half the radar measurement. This is due to a light off shore wind that day that resulted in small SWH for both the buoy and the radars as well as a shorter fetch for the development of waves at the buoy site as compared with the ship location. (Author)

AD-A083 694/0 PC **A04**/MF **A01**
West Virginia Univ Morgantown Dept of Chemical Engineering
Biological Availability of Total Phosphorus.
Final rept.,
Terry Logan, Frank H. Verhoff, and Joseph V. DePinto. Jan 79, 71p
Contract DACW49-79-C-0002
Prepared in cooperation with Ohio State Univ., Dept. of Agronomy and Clarkson College.

This paper discusses the bioavailability of Lake Erie tributary sediment phosphate as determined by chemical extraction and algal uptake. This report includes the following: (1) Review of the literature on procedures to estimate biologically available sediment phosphate (BSP) including sequential chemical extraction, resin extraction, P desorption and various algal bioassay techniques; (2) Sequential chemical extraction of P from sus-

pended sediments in Lake Erie drainage Basin tributaries; (3) Algal uptake of sediment P from several suspended sediments from Lake Erie Basin tributaries; (4) Conclusions from the project studies; and (5) Extrapolation and implications for the Lake Erie Basin. (Author)

AD-A083 695/7 PC A03/MF A01
West Virginia Univ Morgantown Dept of Chemical Engineering
Measurement of Availability Rate for Total Phosphorus from River Waters.
Final rept.,
Frank H. Verhoff, Marc Heffner, and W. A. Sack.
Jan 78, 41p
Contract DACW49-78-C-0011

The general goal of the contract was to measure the availability for biological growth of the total phosphorus transported during storm events into Lake Erie. This information was required because previous investigations by the Corps of Engineers (1975) indicated that most of the total phosphorus transport into Lake Erie occurred during the high flow events which happened most frequently in the spring of the year. The general productivity of Lake Erie could then be expected to depend upon availability of this transported total phosphorus. The investigation of this availability question was divided into two parts; the chemical and the biological measurements. This section of the research is concerned with biological studies, although the biological study samples were also analyzed chemically in the other part of the investigation. The biological tests as proposed in the contract were based upon previous knowledge of the weather activities in the Sandusky River basin and upon biological availability studies for lake sediments. In reality, the weather did not cooperate and the suspended materials in storm river water differed significantly from the suspended material found in lake sediments. (Author)

AD-A083 896/1 PC A06/MF A01
Coast Guard Washington DC
The Possible Impact of Vessel Wakes on Bank Erosion.
Final rept.,
Fredrick E. Camfield, Robert E. L. Ray, and James W. Eckert. Dec 79, 114p Rept no. USCG-W-1-80

A summary is given of the knowledge available on vessel-generated wake, and the possible impact of this vessel wake on bank erosion. A literature survey was conducted to identify the various causes of bank erosion along waterways. A summary of the various natural effects and possible vessel effects is provided. Recession of waterway banks involves a large number of effects. The physical and chemical nature of the channel's water, the materials forming the bank, and the groundwater may increase the soil's erodibility by formerly noneroding water currents, wind waves, or vessel wakes. No computational methods exist for linking a vessel with a chosen hull shape, traveling at a chosen speed in a channel of chosen depth and chosen cross-sectional area and shape with banks of chosen height and materials, to a predicted occurrence of erosion.

PB80-175052 PC A10/MF A01
Metropolitan Sewerage District of the County of Milwaukee, WI.
Verification of the Water Quality Impacts of Combined Sewer Overflow.
Final rept. Aug 76-Dec 78,
Thomas L. Meinholz, William A. Kreutzberger, Martin E. Harper, and Kevin J. Fay. Dec 79, 204p EPA-600/2-79-155
Grant EPA-R-804518
Prepared in cooperation with Rexnord, Inc., Milwaukee, WI.

The purpose of this study was to identify the source and mechanism of the water quality impacts in the Milwaukee River following wet weather discharges. Monitoring surveys have demonstrated that there is often a rapid decline in dissolved oxygen following combined sewer overflow discharge events in the lower portions of the river. Water quality modeling of the river with Harper's water quality model indicate that the loadings from combined and storm sewer discharges are not sufficient to cause the observed rapid declines in DO. The results of laboratory and field investigations indicate that bottom sediments within the lower river are a significant sink for DO and are linked to the rapid loss of DO. The mechanism of this rapid DO decline is the scouring of sediment oxygen demanding materials by submerged CSO outfalls.

PB80-176118 PC A03/MF A01
Kentucky Water Resources Research Inst., Lexington.
An Environmental Study of the Origin, Distribution, and Bioaccumulation of Selenium in Kentucky and Barkley Lakes.
Research rept.,
B. E. McClellan, and Kenneth J. Frazer. Feb 80, 47p W80-04672, OWRT-A-075-KY(1)
Contracts DI-14-34-0001-8019, DI-14-34-0001-9019
Prepared in cooperation with Murray State Univ., KY.

Samples of water, bottom sediment, and fish were analyzed for toxic metal ion content. The samples were collected from several selected sites along Kentucky and Barkley Lakes as well as the Cumberland River and several sub-impoundments along these aquatic systems. Emphasis was placed on selenium, although several other metal ions were determined. The results showed that there are no serious pollution problems with As, Cd, Cr, Cu, Hg, Pb, Se, Sr, Zn, or Zr at any of the sites examined. Actually, none of the trace metals examined even come close to the EPA limits on fish, with the exception of lead in the White Crappie and mercury in the Bass.

PB80-176852 PC A07/MF A01
Minnesota Univ.-Duluth. Dept. of Physics.
Red Clay Turbidity and its Transport in Lake Superior.
Final rept.,
Michael Sydor, Richard T. Clapper, Gordon J. Oman, and Kirby R. Stortz. Jan 79, 141p EPA-905/9-79-004
Grant EPA-R-005175-01

Red clay plumes in western Lake Superior are studied using Landsat satellite imagery to determine the relative magnitude of the three sources of the observed turbidity: erosion of the Wisconsin south shore red clay banks, resuspension of bottom sediments, and runoff from the many streams which flow through the red clay belt and then into the lake. A comprehensive sampling program was conducted during the spring of 1975 to determine the runoff contribution to the total load observed in the lake. A numerical model for water transports in Lake Superior as a function of winds is developed. This model is verified by comparison of observed and predicted water levels at several locations around the lake, and by comparison of the predicted transport patterns to actual turbidity distributions observed in Landsat imagery.

PB80-177009 PC A05/MF A01
Environmental Monitoring and Support Lab., Las Vegas, NV.
Phytoplankton Water Quality Relationships in U.S. Lakes. Part VI: The Common Phytoplankton Genera From Eastern and Southeastern Lakes.
Rept. for 7 Mar-14 Nov 73,
W. D. Taylor, S. C Hern, L. R Williams, V. W. Lambou, and M. K. Morris. Apr 79, 96p EPA-600/3-79-051
Prepared in cooperation with Nevada Univ., Las Vegas. Dept. of Biological Sciences. See also Part 7, PB80-153679.

This report analyzes and compares environmental conditions associated with the 57 most common genera of phytoplankton encountered in the National Eutrophication Survey of 250 lakes in 17 eastern and southeastern States during 1973. Among the findings of this study are: (1) There is an extensive overlap of seasonal preference for most genera, (2) the wide ranges in environmental conditions for most genera effectively eliminate all of the 57 genera as strong, stand-alone indicator organisms, and (3) environmental trends were reflected in mean parameter values in such a way that a nutrient-rich group of genera and a nutrient-poor group of genera resulted. The development of biological water quality indices based on the last finding is discussed.

PB80-177033 PC A02/MF A01
Municipal Environmental Research Lab., Edison, NJ. Storm and Combined Sewer Section.
Urban Runoff and Combined Sewer Overflow.
Richard Field, Robert A. Dorival, and Joseph Janeczek, Jr. 1979, 14p EPA-600/J-79-066
Pub. in Jnl. Water Pollution Control Federation, v51 n6 p1281-1294 Jun 79.

A general discussion of urban runoff pollution including the impact of urban runoff on water quality, and the control and handling of non-point source pollutants is presented. The importance of various planning and design considerations are stressed. Long range control planning, management strategies, runoff simulation and various computer models such as SWMM and STORM are discussed. The benefits of source and collection system controls are presented on a cost-effectiveness basis, and a review is made of innovative physical/chemical treatment processes. The information is presented in the form of a literature review.

PB80-177256 PC A04/MF A01
Geological Survey, Austin, TX. Water Resources Div.
Use of the STORM (Storage, Treatment, Overflow, and Runoff) Model for Estimating the Quantity and Quality of Runoff from the Metropolitan Area of Houston, Texas.
Water-Resources investigations (Final),
Kidd M. Waddell, Bernard C. Massey, and Marshall E. Jennings. Nov 79, 61p USGS/WRD/WRI-80/023, USGS/WRI-79-74
Prepared in cooperation with Texas Dept. of Water Resources, Austin.

The 'STORM' model, developed by the U.S. Army Corps of Engineers, was selected from existing models and adapted to use available data to compute runoff from the Houston, Texas, area and to compute the loads and concentrations of biochemical-oxygen demand, dissolved solids, total phosphorus, total organic carbon, total nitrogen, and fecal-coliform bacteria. The water-quality data simulated by the STORM model will be used by the Texas Department of Water Resources to refine and verify a model of the Galveston Bay estuarine system.

PB80-177579 PC A20/MF A01
Geological Survey, Baton Rouge, LA. Water Resources Div.
Water Resources Data for Louisiana, Water Year 1979. Volume 2. Southern Louisiana.
Water-data rept. 1 Oct 78-30 Sep 79.
Jan 80, 474p USGS/WRD/HD-80/015, USGS-WDR-LA-79-2
See also Volume 1, PB80-153299.

Water resources data for the 1979 water year for Louisiana consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality of ground water. This report, in three volumes, contains records for water discharge at 78 gaging stations (including stage for 72 of these stations); stage only for 42 gaging stations and 10 lakes; contents for 1 reservoir; water quality for 146 surface-water stations (including 22 gaging stations, 52 miscellaneous sites, and 24 lakes), and 335 wells; and water levels for 685 observation wells. Also included are data for 212 crest-stage and flood-profile partial-record stations.

PB80-177587 PC A99/MF A01
Geological Survey, Cheyenne, WY. Water Resources Div.
Water Resources Data for Wyoming. Water Year 1978. Volume 2. Green River Basin, Bear River Basin, and Snake River Basin.
Water-data rept. (Annual), 1 Oct 77-30 Sep 78.
1980, 737p USGS/WRD/HD-80/021, USGS/WDR/WY-78-2
See also Volume 1 dated Jan 80, PB80-165152.

Water resources data for the 1978 water year for Wyoming consists of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality of wells. Volume 2 of this report contains discharge records for 62 gaging stations; stage and contents for 5 lakes and reser-

voirs; water quality for 43 gaging stations, 19 ungaged stations, and 75 wells and springs; and water levels for 8 observation wells. Also included are 24 crest-stage partial-record stations.

PB80-178205 PC **A02**/MF **A01**
Geological Survey, Menlo Park, CA. Water Resources Div.
The Potential for Developing Ground-Water Supplies in the Pescadero Area, San Mateo County, California.
Water-resources investigations,
J. P. Akers. Jan 80, 13p USGS/WRD/WRI-80/021, USGS/WRI-80-6
Prepared in cooperation with San Mateo County, CA.

Adequate supplies of ground water for municipal use generally are not available within a 3-mile radius of Pescadero, San Mateo County, California. The required quantity of 100 gallons per minute probably could be obtained from one or more wells in the alluvium along Pescadero Creek; however, the quality of the water probably would deteriorate with time and might not be suitable for public supply for more than 20 or 30 years. Sand and gravel beds below 60 feet in the alluvium near the junction of Honsinger and Pescadero Creeks offer the best potential for developing domestic water supplies.

PB80-179211 PC **A18**/MF **A01**
Geological Survey, Towson, MD. Water Resources Div.
Water Resources Data for Maryland and Delaware, Water Year 1979.
Water data rept. (Annual), 1 Oct 78-30 Sep 79, Mar 80, 406p USGS/WRD/HD-80/022, USGS-WDR-MD-DE-79-1
See also report for 1978, PB-296 418.

Water resources data for the 1979 water year for Maryland and Delaware consist of records of stage, discharge, and water quality of streams; stage and contents of lakes and reservoirs; and water levels and water quality of ground-water wells. This volume contains records for water discharge at 102 gaging stations; stage and contents at 1 reservoir; water quality at 44 gaging stations and 40 wells; and water levels at 28 observation wells. Also included are data for 15 crest-stage, 87 low-flow, and 4 tidal crest-stage partial-record stations.

PB80-180532 PC **A12**/MF **A01**
Geological Survey, Iowa City, IA. Water Resources Div.
Water Resources Data for Iowa, Water Year 1979.
Water-data rept. (Annual), 1 Oct 78-30 Sep 79. Mar 80, 264p USGS/WRD/HD-80-025, USGS-WDR-IA-79-1
See also report dated Jul 79, PB80-116676. Prepared in cooperation with State of Iowa.

Water resources data for the 1979 water year for Iowa consists of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels in wells. This report contains discharge records for 122 gaging stations; stage and contents for 6 lakes and reservoirs; water quality for 23 gaging stations; and water levels for 32 observation wells. Also included are 124 crest-stage partial-record stations.

PB80-180623 PC **A02**/MF **A01**
Delaware Univ., Newark. Dept. of Geography.
The Use of the Climatic Water Budget in Water Resources Management and Control.
Technical research project completion rept. 1 Oct 77-30 Sep 79,
John R. Mather. Nov 79, 11p W80-04872, OWRT-A-040-DEL(2)
Contract DI-14-34-0001-9008

Comparison of the monthly or daily climatic supply of water (precipitation) with the climatic demands for water (evapotranspiration) in a water budget accounting framework results in quantitative information on such factors as recharge of water to the water table, streamflow, irrigation need, and storage of moisture in the soil. The information is needed by planners, engineers, agriculturalists, hydrologists and others who are concerned with water resources and their modification by human or natural actions. The results of the study have been presented in a series of primers which describe how the climatic water budget can be adapted to solve particular water problems. Titles of the six primers are: WATBUG: A FORTRAN IV Algorithm for Calculating the Climatic Water Budget; The Use of the Climatic Water Budget in Irrigation Scheduling: Iowa; The Use of the Water Budget in Evaluating Leaching Through Solid Waste Landfills; The Influence of Land-Use Change on Water Resources; Use of the Climatic Water Budget to Estimate Streamflow; The Use of the Climatic Water Budget to Evaluate the Validity of a Precipitation Record.

PB80-180748 PC **A99**/MF **A01**
Geological Survey, Menlo Park, CA. Water Resources Div.
Water Resources Data for California, Water Year 1978. Volume I. Colorado River Basin, Southern Great Basin from Mexican Border to Mono Lake Basin, and Pacific Slope Basins from Tijuana River to Santa Maria River.
Water-data rept. (Annual), 1 Oct 77-30 Sep 78. Apr 80, 646p USGS/WRD/HD-80/018, USGS-WDR-CA-78-1
See also Volume 3 for Water Year 1978, PB80-155534. Prepared in cooperation with California State Dept. of Water Resources, Sacramento.

Volume 1 of water resources data for the 1978 water year for California consists of records of stage, discharge, and water quality of streams; stage, contents, and water quality in lakes and reservoirs; and water levels in wells. This report contains discharge records for 239 gaging stations; state and contents for 19 lakes and reservoirs; water quality for 74 stations; water levels for 32 observation wells. Also included are 26 crest-stage partial-record stations.

PB80-180789 PC **A06**/MF **A01**
Purdue Univ., Lafayette, IN. Water Resources Research Center.
Wind-Driven Circulation in Small Shallow Lakes: Laboratory and Computational Experiments.
Technical rept. (Final),
Aldo Giorgini, and Donald D. Gray. Apr 80, 111p PWRRC-TR-128, W80-04870, OWRT-A-048-IND(2)

The research deals mainly with laboratory experiments and computational experiments. The laboratory experiments present the circulation patterns caused by different winds in two lake models built in the wind tunnel: a paraboloidal lake and a reduction of the Blackbird Pond, near West Lafayette. The experiments were executed in order to have controlled standards of comparison with the numerical experiments. The computational part of the research has been performed by using the Fast Fourier Transform algorithm technique. This was considered necessary because of the high sensitivity of sediments patterns to small velocity errors. A detailed theoretical background for the simulation is presented and several numerical experiments are performed: on the paraboloidal lake, on the Blackbird Pond bathymetry, and on a special bathymetry for which an exact solution has been found.

PB80-180805 PC **A04**/MF **A01**
South Dakota Cooperative Fishery Research Unit, Brookings.
Winter Limnological Conditions in a Prairie Pothole Lake and the Application of Molecular Oxygen,
Richard A. Fike. Apr 79, 73p W80-04812, OWRT-A-059-SDAK(1)
Contract DI-14-34-0001-7088
Prepared in cooperation with South Dakota State Univ., Brookings. Water Resources Research Inst.

The use of molecular oxygen aeration under the ice cover as a method to prevent winterkill in Round Lake, South Dakota, was evaluated during the winter of 1977-1978. Physical, chemical and biological limnological conditions are documented for the period. Round Lake and other shallow eutrophic pothole lakes in South Dakota often suffer winterkill due to their high level of nutrients that promote rapid phytoplankton growth in summer. These phytoplankton die and decay rapidly consuming dissolved oxygen by catabolic processes in winter when the ice and snow cover prevents them from getting light. During the winter studied, the ice and snow cover was formed by December 20 and after that date phytoplankton numbers and chlorophyll concentration decreased.

PB80-180870 PC **A04**/MF **A01**
Washington Univ., Seattle. Charles W. Harris Hydraulics Lab.
Reliability of Cyclic Surface and Groundwater Storage Systems for Water Supply: A Preliminary Assessment.
Technical rept.,
Dennis P. Lettenmaier, and Stephen J. Burges. Nov 79, 74p TR-64, W80-04878, OWRT-A-097-WASH(2)

A simplified cyclic water resources system involving a single surface reservoir and an adjacent storage aquifer was modeled and evaluated both physically and economically. If fixed annual water demand cannot be met by annual inflows to the surface reservoir, pumpage from the aquifer is used to supply the deficit. The aquifer is recharged by surface reservoir release during periods of reservoir inflow in excess of storage capacity. Parameters used to assess physical performance include indices of aggregate system supply deficits, pumping requirements, and the frequency of limitation situations such as empty or full aquifer, empty or full surface reservoir, and pumping or recharge equal to capacity. For the economic analysis a 40 year project life was assumed. Thirty-two physical and streamflow parameter combinations were used with the empirical cumulative distribution function of 18 performance measures to generate data. Recharge and pumping capacities were set to relatively large values so that system performance was generally governed by the combined storage capacity.

PB80-180896 PC **A04**/MF **A01**
Delaware Univ., Newark. Water Resources Center.
Use of the Climatic Water Budget to Estimate Streamflow.
Technical research rept.,
John R. Mather. Jul 79, 63p CONTRIB-27, W80-04874, OWRT-A-040-DEL(4)
Contract DI-14-34-0001-9008

The climatic water budget provides values of water surplus, the precipitation in excess of both the evapotranspiration needs and the needs for recharge of storage in the soil root zone. It is this surplus water which will ultimately find its way to the surface to the surface streams. This report describes the problems involved in obtaining good agreement between monthly computed and measured runoff, the problems of snow accumulation and snowmelt runoff and illustrates in a step-by-step example how to lag the monthly surplus values to simulate the slow movement of water through the soil to the water table and then to the surface stream. The report also includes all necessary tables and instructions to permit computation of direct overland runoff by means of the Soil Conservation Service method and shows how such an approach can be incorporated into the climatic water budget bookkeeping procedure.

PB80-180904 PC **A04**/MF **A01**
Delaware Univ., Newark. Water Resources Center.
The Influence of Land-Use Change on Water Resources.
Technical research rept.,
John R. Mather. Jun 79, 70p CONTRIB-16, W80-04873, OWRT-A-040-DEL(6)
Contract DI-14-34-0001-9008

This report provides detailed examples of the hydrologic consequences of two specific land-use changes. The first involves the effect on streamflow of a gradual change from cultivation to suburbanization in a basin near Wilmington, Delaware, while the second involves the effect on recharge to the water table of introducing a suburban housing development in a formerly agricultural and wooded tract. Both examples make use of information developed from the climatic water budget. In the first example, it is found that the gradual change from forest and cultivation to suburbanization has resulted in a progressive increase in stream runoff averaging about 0.04 inch per year over the past 30 years.

PB80-180912 PC A03/MF A01
New York State Coll. of Agriculture and Life Sciences, Ithaca. Ecology and Systematics Section.
Nutrient Interactions and Algal Quality in Cayuga Lake.
Technical completion rept.,
John P. Barlow. Apr 80, 39p W80-04801, OWRT-C-8054(5206)(1)
Contract DI-14-31-0001-5206

Mixed phytoplankton from Cayuga Lake, N.Y. were subjected to perturbations of Si and P in continuous flow experiments. Diatom growth rates and cell quotas in late summer (July-August) were used to derive parameters for Droop's empirical growth equation. Using these parameters with Droop's relations it was possible to identify periods when diatom growth was controlled by P or Si, and to relate rate of growth to cell quotas during late summer. These same parameters did not, however, serve to relate observed growth rate to cell quotas at lower temperatures of experiments run in spring and early summer (May-June).

PB80-181100 PC A06/MF A01
Fish and Wildlife Service, Fort Collins, CO. Cooperative Instream Flow Service Group.
Instream Flow Methodologies for Regional and National Assessments.
Instream flow information paper,
Keith Bayha. Dec 78, 114p IFIP-7, FWS/OBS-78/61
Library of Congress catalog card no. 80-600011.

This paper is largely an in-depth documentation of the effort made over a four year period to consider instream flow values as part of the Water Resources Council's Second National Water Assessment. It includes a summary of methodologies available in 1974, the series of revisions made in arriving at the final Instream Flow approximations published in the Assessment, the analysis of depletion ratios made in the resources of the 106 assessment subregions and the legal and institutional aspects relative to instream flow. It also summarizes a new method developed subsequent to the National Assessment effort which offers promise of providing an improved basis for assessing instream flow needs for level A and B planning studies.

PB80-181233 PC A04/MF A01
Illinois Univ. at Urbana-Champaign. Water Resources Center.
Surcharge of Sewer Systems.
Research rept.,
Ben Chie Yen, and Nicholas Pansic. Mar 80, 70p ILU-WRC-80-0149, W80-04867, OWRT-A-86-ILL(2)
Contract DI-14-31-0001-8015

Surcharge of a sewer is the situation in which the sewer entrance and exit are submerged and the pipe is flowing full and under pressure. In this report the hydraulics of the surcharged flow as well as the open-channel flow leading to and after surcharge is discussed in detail and formulated mathematically. The transition between open-channel and surcharge flows is also discussed. This information is especially useful for those who intend to make accurate advanced simulation of sewer flows. In this study an approximate kinematic wave -surcharge model called SURKNET is formulated to simulate open-channel and surcharge flow of storm runoff in a sewer system. An example application of the model on a hypothetical sewer system is presented.

PB80-181340 PC A03/MF A01
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
Stream Dynamics: An Overview for Land Managers.
Forest Service general technical rept. (Final),
Burchard H. Heede. Apr 80, 32p FSGTR-RM-72

Concepts of stream dynamics are demonstrated through discussion of processes and process indicators; theory is included only where helpful to explain concepts. Present knowledge allows only qualitative prediction of stream behavior. However, such predictions show how management actions will affect the stream and its environment.

PB80-182017 PC A02/MF A01
Rutgers - The State Univ., New Brunswick, NJ. Water Resources Research Inst.
Settleability of Urban Runoff Pollution.
Partial completion rept.,
William Whipple, Jr., and Joseph V. Hunter. Apr 80, 25p W80-04807, OWRT-A-058-NJ(1)
Contract DI-14-34-0001-0132

Because of the growing interest in stormwater management, and particularly of the possibility of using detention basins for removing particulate pollution, it is important to determine the effectiveness of such basins for removal of various polluting substances. In the study reported upon, samples of urban runoff were allowed to settle in a large tube, and the quantity of each pollutant settling in a given time period determined. There was more variability in rate of settlement of specific pollutants than for total suspended solids. Lead and hydrocarbons settled out 60-65% in 32 hours, only slightly slower than total suspended solids. BOD and copper were removed at somewhat lower rates, and zinc even lower. Coliform counts were reduced by an order of magnitude. These results indicate the probable effectiveness of retention of stormwaters in removing particulate pollutants.

PB80-182058 PC A03/MF A01
Nevada Univ. System, Reno. Desert Research Inst.
Linearized Subhydrograph Routing of Direct Runoff,
Vulli L. Gupta, Paul C. Orphan, and John W. Bird. Sep 79, 35p PUB-41060, W80-04813, OWRT-A-090-NEV(1)
Contract DI-14-34-001-9030

A pilot study was conducted involving the development and testing of a computerized methodology entitled 'Linearized Subhydrograph Routing' for the estimation and simulation of the peak rates of runoff from small drainage basins. The method can be considered a refinement over the more popularly used 'rational method'. Selected rainfall-runoff events of twelve drainage basins were utilized in testing the methodology. Several limitations were recognized.

PB80-182496 PC A05/MF A01
Wisconsin Univ.-Superior. Dept. of Biology.
Influence of Advanced Wastewater Treatment on the Fishery Resource of Shagawa Lake, Minnesota.
Final rept. 1974-77,
William A. Swenson. Mar 80, 96p EPA-600/3-80-036

This project was conducted to measure the response of the warmwater fish populations in Shagawa Lake, Minnesota, to altered trophic conditions brought about by phosphate removal from sewage discharges entering the lake. The project also served to provide basic information on the mechanisms through which a lake's trophic status controls its fish species complex. Abundance, distribution, growth, and feeding interrelationships of walleye (Stizostedion vitreum), northern pike (Esox lucius), yellow perch (Perca flavenscens), and lake herring (Coregonus artedii) were described in relation to changes in prey density and other environmental factors.

PB80-183957 PC A13/MF A01
Colorado State Univ., Fort Collins. Dept. of Civil Engineering.
Water Quality Characteristics of the US Waters of Lake Ontario During the International Field Year for the Great Lakes (IFYGL) and Modeling Contaminant Load-Water Quality Response Relationships in the Nearshore Waters of the Great Lakes,
G. Fred Lee, and R. Anne Jones. Oct 79, 287p NOAA-80040802
Contract NOAA-03-6-022-35196

The major U.S. tributaries to Lake Ontario are contributing sufficient concentrations of phosphorus, zinc, cadmium and copper to potentially cause significant water quality deterioration in the nearshore and open waters of the lake. The concentrations of these contaminants were found to be highly variable in the nearshore, reflecting the high variability of the inputs from some of the major tributaries.

PB80-184161 MF A01
National Oceanic and Atmospheric Administration, Ann Arbor, MI. Great Lakes Environmental Research Lab.
Lake Ontario Chemical and Physical Characteristics Data for 1972.
Data rept.,
Gerald L. Bell. Dec 79, 15p NOAA-DR-ERL-GLERL-9, GLERL-CONTRIB-172, NOAA-80032119
Microfiche copies only.

Water samples at standard depths, were collected in Lake Ontario at established stations in the course of four cruises during the 1972 open-water season. The sampling program and analytical methods are described. Chemical characteristics of the water are listed by cruise for each station and sampling depth. The statistical summaries showing lake-wide means, standard deviations, and sample sizes of selected variables are presented by depth for each cruise period.

PB80-184187 MF A01
National Oceanic and Atmospheric Administration, Ann Arbor, MI. Great Lakes Environmental Research Lab.
Lake Huron Chemical and Physical Characteristics Data for 1966.
Data rept.,
Gerald L. Bell. Jan 80, 17p NOAA-DR-ERL-GLERL-3, GLERL-CONTRIB-177, NOAA-80032113
Microfiche copies only.

Water samples at standard depths, bottom sediment, and meteorological data were collected in Lake Huron at established stations in the course of eight cruises during the 1966 open-water season. The sampling program and analytical methods are described. Chemical characteristics of the water and bottom sediment are listed by cruise for each station and sampling depth. Wind and wave data are listed by cruise for each station. The statistical summaries showing lake-wide means, standard deviations, and sample sizes of selected variables are presented by depth for each cruise period.

PB80-185101 MF A01
National Oceanic and Atmospheric Administration, Ann Arbor, MI. Great Lakes Environmental Research Lab.
Eastern Lake Superior Chemical and Physical Characteristics Data for 1965.
Data rept.,
Gerald L. Bell. Jan 80, 17p NOAA-DR-ERL-GLERL-5, GLERL-CONTRIB-171, NOAA-80032115
Microfiche copies only.

Water samples at standard depths, bottom sediment and meteorological data were collected in Eastern Lake Superior at established stations in the course of seven lake cruises and four St. Marys River cruises during the 1968 open-water season. The sampling program and analytical methods are described. Chemical characteristics of the water and bottom sediment are listed by cruise for each station and sampling depth. Wind, wave, and sediment data are listed by cruise for each station. The statistical summaries showing lake-wide means, standard deviations and sample sizes of selected variables are presented by depth for each cruise period.

PB80-185119 MF A01
National Oceanic and Atmospheric Administration, Ann Arbor, MI. Great Lakes Environmental Research Lab.
Lake St. Clair and St. Clair and Detroit Rivers Chemical and Physical Characteristics Data for 1974.
Data rept.,
Gerald L. Bell. Jan 80, 17p NOAA-DR-ERL-GLERL-12, GLERL-CONTRIB-169, NOAA-80032122
Microfiche copies only.

Water samples at standard depths, bottom sediment, and meteorological data were collected in Lake St. Clair and in the St. Clair and Detroit Rivers at established stations in the course of nine lake and river cruises during the 1974 open-water season. The sampling program and analytical methods are described. Chemical characteristics of the water and bottom sediment are listed by cruise for each station and sampling depth. Wind, wave, and sediment data are listed by cruise for each station. The statistical summaries showing

lake-wide means, standard deviations, and sample sizes of selected variables are presented by depth for each cruise period.

PB80-185127 MF **A01**
National Oceanic and Atmospheric Administration, Ann Arbor, MI. Great Lakes Environmental Research Lab.
Northern Lake Michigan Chemical and Physical Characteristics Data for 1970.
Data rept.,
Gerald L. Bell. Jan 80, 17p NOAA-DR-ERL-GLERL-7, GLERL-CONTRIB-173, NOAA-80032117
Microfiche copies only.

Water samples at standard depths, bottom sediment, and meteorological data were collected in Northern Lake Michigan at established stations in the course of 12 cruises during the 1970 open-water season. The sampling program and analytical methods are described. Chemical characteristics of the water and bottom sediment are listed by cruise for each station and sampling depth. Wind, wave, and sediment data are listed by cruise for each station. The statistical summaries showing lake-wide means, standard deviations, and sample sizes of selected variables are presented by depth for each cruise period.

PB80-185143 MF **A01**
National Oceanic and Atmospheric Administration, Ann Arbor, MI. Great Lakes Environmental Research Lab.
Lake Erie Chemical and Physical Characteristics Data for 1965.
Data rept.,
Gerald L. Bell. Jan 80, 16p NOAA-DR-ERL-GLERL-2, GLERL-CONTRIB-175, NOAA-80032112
Microfiche copies only.

Water samples at standard depths, bottom sediment, and meteorological data were collected in Lake Erie at established stations in the course of nine cruises during the 1965 open-water season. The sampling program and analytical methods are described. Chemical characteristics of the water and bottom sediment are listed by cruise for each station and sampling depth. Wind and wave data are listed by cruise for each station. The statistical summaries showing lake-wide means, standard deviations, and sample sizes of selected variables are presented by depth for each cruise period.

PB80-185150 MF **A01**
National Oceanic and Atmospheric Administration, Ann Arbor, MI. Great Lakes Environmental Research Lab.
Western Lake Superior Chemical and Physical Characteristics Data for 1969.
Data rept.,
Gerald L. Bell. Jan 80, 17p NOAA-DR-ERL-GLERL-6, GLERL-CONTRIB-174, NOAA-80032116
Microfiche copies only.

Water samples at standard depths, bottom sediment and meteorological data were collected in Western Lake Superior at established stations in the course of 11 cruises during the 1969 open-water season. The sampling program and analytical methods are described. Chemical characteristics of the water and bottom sediment are listed by cruise for each station and sampling depth. Wind, wave, and sediment data are listed by cruise for each station. The statistical summaries showing lake-wide means, standard deviations, and sample sizes of selected variables are presented by depth for each cruise period.

PB80-185168 MF **A01**
National Oceanic and Atmospheric Administration, Ann Arbor, MI. Great Lakes Environmental Research Lab.
Oswego Harbor, New York, Chemical and Physical Characteristics Data for 1972.
Data rept.,
Gerald L. Bell. Jan 80, 17p NOAA-DR-ERL-GLERL-10, GLERL-CONTRIB-179, NOAA-80032120
Microfiche copies only.

Water samples at standard depths, bottom sediment, and meteorological data were collected in Oswego Harbor, N.Y., at established stations in the course of 33 one-day harbor cruises during the 1972 open-water season. The sampling program and analytical methods are described. Chemical characteristics of the water and bottom sediment are listed by cruise for each station and sampling depth. Wind, wave, and sediment data are listed by cruise for each station.

PB80-185176 MF **A01**
National Oceanic and Atmospheric Administration, Ann Arbor, MI. Great Lakes Environmental Research Lab.
Straits of Mackinac Chemical and Physical Characteristics Data for 1973.
Data rept.,
Gerald L. Bell. Jan 80, 18p NOAA-DR-ERL-GLERL-11, GLERL-CONTRIB-180, NOAA-80032121
Microfiche copies only.

Water samples at standard depths, bottom sediment, and meteorological data were collected in the Straits of Mackinac and Northern Lake Huron at established stations in the course of 94 lake cruises during the 1973 open-water season. The sampling program and analytical methods are described. Chemical characteristics of the water and bottom sediment are listed by cruise for each station and sampling depth. Wind, wave, and sediment data are listed by cruise for each station. The statistical summaries showing lake-wide means, standards deviations, and sample sizes of selected variables are presented by depth for each cruise period.

PB80-185184 MF **A01**
National Oceanic and Atmospheric Administration, Ann Arbor, MI. Great Lakes Environmental Research Lab.
Southern Lake Michigan Chemical and Physical Characteristics Data for 1975.
Data rept.,
Gerald L. Bell. Jan 80, 32p NOAA-DR-ERL-GLERL-13, NOAA-80032802
Microfiche copies only.

Water samples at standard depths, bottom sediment, and meteorological data were collected at established stations in Southern Lake Michigan, in six harbors, and at one nearshore site during the 1975 open-water season. There were 5 lake cruises and 9 to 11 one-day cruises at each harbor. The sampling programs and analytical methods are described. Chemical characteristics of the water and of the bottom sediment sampled during one cruise are listed for each station and sampling depth. Wind, wave, and sediment data are listed by cruise for each station. The statistical summaries showing lake-wide means, standard deviations, and sample sizes of selected variables are presented by depth for each lake cruise period. These means do not include the harbor data.

8I. Mining Engineering

CONF-791160-2 PC **A02**/MF **A01**
Argonne National Lab., IL.
Coal/Oil Mixture Pipeline: A Viable Alternative Coal Transportation System.
J. B. L. Harkness, and L. J. Petrovic. 1979, 23p
Contract W-31-109-ENG-38
International symposium on coal-oil mixture combustion, Danvers, MA, USA, 27 Nov 1979.

Slurry pipeline systems have been promoted as minimizing the environmental and socio-economic impacts of rail transportation and as increasing competition in interstate coal transportation. However, the scarce water resources of the coal rich western states may limit the number and/or capacity of these systems. Furthermore, these systems are not without their own operating and environmental problems. In this paper, a coal transportation system which utilizes coal/oil mixture technology is compared to the coal/water system and to another alternative, coal/methanol system. The primary considerations addressed are the system design considerations and trade-offs, the resource requirements (including capital) and the cost of delivered energy. Considerations such as the system environmental impacts, the status of the technologies, oil quality and supply, and the potential system flexibilities are discussed qualitatively. This qualitative comparison shows that the coal/oil slurry pipeline is an attractive economic, environmental, and technical alternative for transporting coal PROVIDED that oil is available in the region. Coal/water pipelines are a second choice based on economics and, furthermore, are limited by their demands on western water resources. The third choice is coal/oil slurry pipelines using oil generated onsite. The main attraction is the saving of about 1/2 the water requirements. However, the capital costs will be high. Coal/methanol slurry pipelines do not appear to have any economic or environmental advantages. Further secondary considerations must be addressed before a technically and economically viable coal/oil surry pipeline could be implemented. (ERA citation 05:014740)

COO-2602-7 PC **A05**/MF **A01**
Case Western Reserve Univ., Cleveland, OH.
Hydrogen Sulphide Stress Corrosion Cracking in Materials for Geothermal Power. Final Report, Phase I.
A. R. Troiano, R. F. Hehemann, and J. A. Peterson. Aug 79, 91p
Contract EY-76-S-02-2602

Two point bent beam, NACE tensile, C-Ring and DCB stress intensity type specimens were employed to examine a series of steels' SSC resistance in the standard NACE solution and in several modifications pertinent to geothermal environments. Where direct comparisons were possible, the different types of tests qualitatively ranked the alloys in the same order. Of the commercially available steels examined suitable for downhole service, a fine-grained version of 4130 with additional Mo and some Cb appeared to have the highest yield strength break-point. High purity versions of this and similar type alloys did exhibit somewhat slightly better resistance to SSC. In this class of constructional type steels, those with higher carbon (.20 - .30C) and those requiring a higher tempering temperature to achieve a given yield strength appear to be more SSC resistant. These steels all exhibit a 15 to 20 percent higher yield strength break-point at service temperatures near 300 to 450 exp 0 F and/or at pH values approaching 7. Several versions of well head equipment type steels with adequate hardenability have demonstrated satisfactory SSC threshold stress values at adequate yield strengths. The austenitic stainless steels displayed the usual sensitivity to chlorides and cold work. Overaging of several of the age hardenable variety improved the resistance to SSC with only a moderate reduction in strength. Two ferritic stainless steels have shown a higher threshold stress than their commonly employed counterpart.Examination of C-ring specimens cut from commercially treated casing and tubing clearly indicated the advantages of a tempered martensitic structure and the very real potential for temper embrittlement. (ERA citation 05:015588)

COO-2708T022-1 PC **A10**/MF **A01**
National Academy of Sciences, Washington, DC.
Continental Scientific Drilling Program.
1979, 201p
Contract EY-76-C-02-2708-022

The dynamics, structure, evolution, and genesis of the continents offer a major scientific challenge. At the same time, society faces many problems that require information about the continental crust for solution. A workshop on continental drilling for scientific purposes addressed the questions of how to maximize the scientific value of current and planned efforts of federal agencies and industry and how to supplement these efforts with holes drilled solely for scientific purpoes. Four panels addressed the scientific and associated societal problems relating to basement structures and deep continental basins, thermal regimes, mineral resources, and earthuqakes. These panels identified the main problems in each area that could be solved by information obtained from drill holes. A fifth panel considered needs for technological developments. The importance of a communications and coordinating mechanism to maximize the scientific results was noted. To this end, a Continental Scientific Drilling Program is outlined, including two advisory and guiding committees, one concerned with scientific objectives, the other with operations. (ERA citation 05:016916)

DOE/ET/28464-1 PC **A06**/MF **A01**
RPC, Inc., Austin, TX.

Geopressured-Geothermal Resource Development on Public Free School Lands.
Jul 79, 105p
Contract ET-78-G-05-5958

The study's findings and recommendations are based upon analysis of the following: financial and economic feasibility of geopressured-geothermal resource development; possible ecological, social, and economic impacts of resource development on PFSL; and legal issues associated with resource development. The results of the analysis are summarized and are discussed in detail in a series of four technical papers which accompany this volume. Existing rules of the General Land Office (GLO), the School Land Board (SLB), and the Railroad Commission of Texas (RRC) were reviewed in light of the above analysis and were discussed with the agencies. The study's recommendations resulted from this analytical and review process; they are discussed. The preliminary draft rules and regulations to govern resource development on PFSL are presented in Appendix A; the accompanying forms and model lease are found in Appendix B. (ERA citation 05:013406)

DOE/MC/03260-4 PC **A04**/MF **A01**
New Mexico Petroleum Recovery Research Center, Socorro.
Displacement of Oil by Carbon Dioxide. Annual Report, October 1978-September 1979.
F. M. Orr, Jr., and J. J. Taber. Feb 80, 72p
Contract AC21-78MC03260

Good progress has been made on all aspects of the carbon dioxide (CO sub 2) research program at the New Mexico Petroleum Recovery Research Center. Construction of high pressure experimental equipment for measurements of CO sub 2 displacement efficiency in cores and slim tubes has been completed. A sophisticated apparatus for measurements of phase behavior and fluid properties of mixtures of CO sub 2 and crude oils has been designed and built. The experimental setup permits a variety of multiple contact phase behavior experiments which explore mixture compositions which realistically model displacement processes at temperatures and pressures of interest. Gas chromatography techniques previously used to characterize crude oils have been extended to allow analyses of mixtures containing CO sub 2 and hydrocarbons ranging from methane to molecules as heavy as tetracontane (C sub 40). A series of displacements with alcohol-oil-water mixtures, which are analogue systems with useful similarities to CO sub 2 -hydrocarbon systems have been completed. A one-dimensonal CO sub 2 flooding simulator has been developed which gives excellent agreement between simulated and experimental results for the analogue alcohol-oil-water displacements. Finally, a qualitative analysis is given for the complex phase behavior observed for mixtures of CO sub 2 and crude oils at temperatures below 50 exp 0 C and the effects of phase behavior on expected displacement efficiency are calculated. The results indicate that relatively small changes in pressure can be expected to have a strong influence on the efficiency of CO sub 2 displacements of crude oils. (ERA citation 05:014766)

DOE/RA-0011(79) PC **A04**/MF **A01**
Department of Energy, Washington, DC. Assistant Secretary for Resource Applications.
Annual Report of Operations. Fiscal Year 1979.
1979, 54p

Naval Petroleum Reserve No. 1, known as Elk Hills, has become one of the largest producing oil fields in America. Output is approaching 160,000 barrels each day from recoverable reserves of over one billion barrels of crude oil. Crude oil production at Elk Hills is expected to reach approximately 200,000 barrels per day by 1982. At that time over 900 new wells will have been drilled. Total production in FY 1979 was 52.6 million barrels, bringing revenues to the US Treasury of over $677 million. Production from the two other Naval Petroleum Reserves, No. 2 (Buena Vista Hills) in California and No. 3 (Teapot Dome) in Wyoming have also been adding to the Nation's energy supplies. The three Naval Oil Shale Reserves in Colorado and Utah contain over four billion barrels of economically recoverable shale oil. DOE is proceeding with a congressionally approved multi-year plan to prepare the reserves for commercial scale production. (ERA citation 05:013056)

DOE/TIC-11119 PC **A05**/MF **A01**
California Energy Commission, Sacramento.
NCPA No. 2: IX Comments and Responses to Draft JES.
1980, 89p

Comments received from twenty-six separate entities are included. Following each letter or set of comments are staff responses. Sections of the draft environmental statement which have been revised in response to these comments are noted. (ERA citation 05:016715)

DOE/TIC-3378 PC **A07**/MF **A01**
Department of Energy, Oak Ridge, TN. Technical Information Center.
Oil Shales: Selected Bibliography of DOE Sponsored Research.
Jan 80, 128p

Four hundred thirty-six citations of reports, journal articles, patents, conference papers, and monographs resulting from Department of Energy sponsored research on oil shales are presented. These citations and approximately 8000 additional citations are a part of the Department of Energy's Energy Information Data Base. The citations are arranged by subject category. Within the categories references to reports are listed in alphanumeric order by report number. Other citations follow in inverse chronological order. Five indexes are provided: Corporate, Author, Subject, Contract Number, and Report Number. (ERA citation 05:017405)

FE-2030-TR16 PC **A06**/MF **A01**
Pennsylvania State Univ., University Park. Coal Research Section.
Automated Microscopical Method for the Characterization of Pyrite in Coal.
K. W. Kuehn, and A. Davis. Aug 79, 115p
Contract EX-76-C-01-2030

The Rapid Scan system of automated reflectance microscopy is a line scanning device capable of characterizing the pyrite content of a coal. The system combines a sophisticated software base with standard hardware components to provide flexibility in analytical format. As a prepared coal sample is moved automatically beneath the microscope objective, reflectance values from adjacent 2 mu m squares are sampled by the photomultiplier tube. These values are stored in computer memory for subsequent calculation of the volumetric proportion of pyrite in the sample. Simultaneously, the Rapid Scan also accumulates a distribution of pyrite chord lengths. In a modification of the Rosiwal linear scanning technique, the number of consecutive readings on a pyrite particle are recorded and stored independently in computer memory. In order to determine the precision of pyrite volume estimates, a suite of coals with varying pyrite content was analyzed at several sample-point densities. The level of precision achieved was found to be a function of sample density and was always superior to the precision of the conventional, visual point counting technique. From these data, sampling plans to achieve a desired level of analytical precision were designed. The ability of the Rapid Scan system to quickly characterize many samples of a feed coal in this manner, makes it a potentially effective tool in helping to optimize preparation facility operation for the removal of pyrite. (ERA citation 05:014702)

FE-3119-8 PC **A02**/MF **A01**
Bituminous Coal Research, Inc., Monroeville, PA.
Assessment of Research Projects and Expenditures by the Coal Industry. 8TH Progress Report, July-September 1979.
Sep 79, 24p
Contract ET-78-C-01-3119

The objective of this program is to obtain information on the research and development expenditures of the coal mining industry. A large portion of the research undertaken by the coal mining industry is informal and, as such, is not well documented; and expenditures are not generally available. It is the aim of this program to determine the extent and areas of research funded by the coal industry. Companies to be contacted include coal producers, equipment manufacturers, and coal resource developers. The program is planned to encompass all phases of mining research, including health and safety, environment, production, and coal preparation. Results to-date are summarized: Deep mines spent more per ton than surface mines; coal companies reported expenditures in every category, while equipment manufacturers were more limited and the categories were directly related to their line of business; and equipment manufacturers reported 77 percent of expenditures for basic and development research, while coal producers reported 89 percent of expenditures for demonstration and application engineering research. However, some unexpected results included: R and D expenditures appeared to be related to geographical regions; as the coal reserves of a company increased, the R and D expenditures per ton decreased; and 41 percent of research expenditures by coal producers were reported in the mine systems design and human resources categories. (ERA citation 05:017311)

GJBX-10(80)(V.1) PC **E11**/MF **E11**
EG and G GeoMetrics, Sunnyvale, CA.
Aerial gamma Ray and Magnetic Survey: Idaho Project, Hailey, Idaho Falls, Elk City Quadrangles of Idaho/Montana and Boise Quadrangle, Oregon/Idaho. Final Report.
Sep 79, 74p
Contract EY-76-C-13-1664

During the months of July and August, 1979, geoMetrics, Inc. collected 11561 line mile of high sensitivity airborne radiometric and magnetic data in Idaho and adjoining portions of Oregon and Montana over four 1 exp 0 x 2 exp 0 NTMS quadrangles (Boise, Hailey, Idaho Falls, and Elk City) as part of the Department of Energy's National Uranium Resource Evaluation Program. All radiometric and magnetic data were fully corrected and interpreted by geoMetrics and are presented as five volumes (one Volume I and four Volume II's). Approximately 95 percent of the surveyed areas are occupied by exposures of intrusive and extrusive rocks. The Cretaceous-Tertiary Idaho Batholith dominates the Elk City and Hailey quadrangles. The Snake River volcanics of Cenozoic Age dominate the Idaho Falls quadrangle and southeast part of the Hailey sheet. Tertiary Columbia River basalts and Idaho volcanics cover the Boise quadrangle. There are only two uranium deposits within the four quadrangles. The main uranium producing areas of Idaho lie adjacent to the surveyed area in the Challis and Dubois quadrangles. (ERA citation 05:014872)

GJBX-10(80)(V.2)(Boise) PC **A13**/MF **A01**
EG and G GeoMetrics, Sunnyvale, CA.
Aerial gamma Ray and Magnetic Survey: Idaho Project, Boise Quadrangle, Oregon/Idaho. Final Report.
Oct 79, 276p
Contract EY-76-C-13-1664

The Boise quadrangle in southwestern Idaho and eastern Oregon lies at the juncture of the Snake River and Harney Plateaus and the Idaho Batholith. Cenozoic igneous rocks cover 90% of the surface of the quadrangle, but rocks of the Idaho Batholith dominate the Boise Mountains. Magnetic data apparently show contributions from both deep and shallow sources. The volcanics are relatively well defined, but deeper-lying structural boundaries are largely masked by the younger igneous rocks in the area. Some boundary faulting in the Snake River Plain appears to have some representation in the magnetics. The Boise quadrangle has been unproductive in terms of uranium mining. Some claims are present in Tertiary volcanics to the north and east of the quadrangle. A total of 163 groups of sample responses in the uranium window qualify as anomalies as defined in Volume I. These anomalies are largely scattered throughout the quadrangle. One large group is associated with the northern Snake River Plain. Some small groups are scattered throughout the Harney Plateau and the Boise Mountains. (ERA citation 05:014873)

GJBX-16(80)(V.1) PC **E04**/MF **E04**
LKB Resources, Inc., Huntingdon Valley, PA.

NURE Aerial gamma-Ray and Magnetic Reconnaissance Survey: Colorado-Arizona Area, Marble Canyon NJ12-11 Quadrangle. Volume I. Narrative Report.
Nov 79, 123p
Contract EY-76-C-13-1664

As part of the Department of Energy (DOE) National Uranium Resource Evaluation Program, LKB Resources, Inc. has performed a rotary-wing reconnaissance high sensitivity radiometric and magnetic survey of the Marble Canyon quadrangle NJ 12-11 located in northern Arizona. The surveyed area consisted of approximately 3246 line miles. The radiometric data were corrected and normalized to 400 feet terrain clearance. The data were identified as to rock type by correlating the data samples with existing geologic maps. Statistics defining the mean and standard deviation of each rock type are presented as listings in Volume I of this report. The departure of the data from its corresponding mean rock type is computed in terms of standard deviation units and is presented graphically as anomaly maps in Volume II and as computer listings in microfiche form in Volume I. Profiles of the normalized averaged data are contained in Volume II, and include traces of the potassium, uranium and thorium count rates, corresponding ratios, and several ancillary sensor data traces, magnetometer radio altimeter and barometric pressure height. A description of the local geology is provided and a discussion of the magnetic and radiometric data is presented together with an evaluation of selected uranium anomalies. (ERA citation 05:014882)

GJBX-23(80) PC **A10**/MF **A01**
Geodata International, Inc., Dallas, TX.
Aerial Radiometric and Magnetic Survey: Winchester National Topographic MAP, Kentucky. Southeast US Project.
1980, 222p
Contract EY-76-C-13-1664

The results of analyses of the airborne gamma radiation and total magnetic field survey flown for the region identified as the Winchester National Topographic Map NJ16-9 are presented. The airborne data gathered are reduced by ground computer facilities to yield profile plots of the basic uranium, thorium and potassium equivalent gamma radiation intensities, ratios of these intensities, aircraft altitude above the earth's surface, total gamma ray and earth's magnetic field intensity, correlated as a function of geologic units. The distribution of data within each geologic unit, for all surveyed map lines and tie lines, has been calculated and is included. Two sets of profiled data for each line are included, with one set displaying the above-cited data. The second set includes only flight line magnetic field, temperature, pressure, altitude data plus magnetic field data as measured at a base station. A general description of the area, including descriptions of the various geologic units and the corresponding airborne data, is included also. (ERA citation 05:014884)

GJBX-24(80) PC **A14**/MF **A01**
Geodata International, Inc., Dallas, TX.
Aerial Radiometric and Magnetic Survey: Llano National Topographic Map, Texas.
1980, 302p
Contract EY-76-C-13-1664

The results of analyses of the airborne gamma radiation and total magnetic field survey flown for the region identified as the Llano National Topographic Map NH14-5 are presented. The airborne data gathered are reduced by ground computer facilities to yield profile plots of the basic uranium, thorium and potassium equivalent gamma radiation intensities, ratios of these intensities, aircraft altitude above the earth's surface, total gamma ray and earth's magnetic field intensity, correlated as a function of geologic units. The distribution of data within each geologic unit, for all surveyed map lines and tie lines, has been calculated and is included. Two sets of profiled data for each line are included, with one set displaying the above-cited data. The second set includes only flight line magnetic field, temperature, pressure, altitude data plus magnetic field data as measured at a base station. A general description of the area, including descriptions of the various geologic units and the corresponding airborne data, is included also. (ERA citation 05:014885)

GJBX-25(80)(V.1) PC **A04**/MF **A01**
EG and G GeoMetrics, Sunnyvale, CA.
Aerial gamma Ray and Magnetic Survey: Nebraska/Texas Project, the Alliance and Scottsbluff Quadrangles of Nebraska. Final Report.
Dec 79, 57p
Contract EY-76-C-13-1664

During the months of September and October 1979, EG and G geoMetrics collected 3156 line miles of high sensitivity airborne radiometric and magnetic data in the state of Nebraska in two 1 by 2 degree NTMS quadrangles. This project is part of the Department of Energy's National Uranium Resource Evaluation Program. All radiometric and magnetic data were fully corrected and interpreted by geoMetrics and are presented as three Volumes (one Volume I and two Volume II's). Both quadrangles are dominated by Tertiary nonmarine strata, though the Sand Hills in the eastern central portion of the area is covered by Quaternary dune sand. Some Late Cretaceous marine shales are exposed in the northwest quadrant of Alliance quadrangle. No uranium deposits are known in this area, but outcrops of shales thought to be uraniferous outcrop in the Alliance quadrangle (Schnabel, 1955). (ERA citation 05:014886)

GJBX-27(80) PC **A12**/MF **A01**
Oak Ridge Gaseous Diffusion Plant, TN.
Hydrogeochemical and Stream Sediment Reconnaissance Basic Data for Hot Springs NTMS Quadrangle, South Dakota.
31 Dec 79, 269p K/UR-132
Contract EY-76-C-13-1664

Results of a reconnaissance geochemical survey of the Hot Springs Quadrangle, South Dakota are reported. Field and laboratory data are presented for 340 groundwater and 394 stream sediment samples. Statistical and areal distributions of uranium and possible uranium-related variables are displayed. A generalized geologic map of the survey area is provided, and pertinent geologic factors which may be of significance in evaluating the potential for uranium mineralization are briefly discussed. The groundwater data indicate potential for uranium mineralization in the north central part of the quadrangle. Groundwaters with high uranium concentrations form a ring around the Black Hills. The ring crosses many geological formations, implying that the location of any existing deposits in this area are structurally controlled and that the sources of the uranium are rock units in the Black Hills. Ash-bearing Tertiary units that have since been removed by erosion are thought to have been a source of uranium in this area. The Pierre Shale, a black, marine shale, also produces groundwaters with relatively high uranium concentrations. These groundwaters may only appear to be anomalously high in uranium due to the lithology of black shales. The sediment data indicate that the highest potential for uranium mineralization occurs in and around the Black Hills. Uranium and thorium in stream sediments are concentrated in heavy and resistate minerals. Sediments with high uranium concentrations appear to be derived from igneous rocks in the Black Hills. Sediments with high-to-moderate uranium values are also derived from the Niobrara Marl and Carlile Shale, but the apparently high values may be due to lithology rather than anomalous uranium concentrations. (ERA citation 05:014889)

GJBX-35(80)(V.1) PC **A06**/MF **A01**
LKB Resources, Inc., Huntingdon Valley, PA.
NURE Aerial gamma-Ray and Magnetic Reconnaissance Survey: Colorado-Arizona Area, Grand Canyon NJ 12-10 Quadrangle. Volume I. Narrative Report.
Dec 79, 117p
Contract EY-76-C-13-1664

As part of the Department of Energy's (DOE) National Uranium Resource Evaluation Program, LKB Resources, Inc. has performed a rotary-wing reconnaissance high sensitivity radiometric and magnetic survey of the Grand Canyon quadrangle NJ 12-10 located in northern Arizona. The surveyed area consisted of approximately 3,246 line miles. The radiometric data were corrected and normalized to 400 feet terrain clearance. The data were identified as to rock type by correlating the data samples with existing geologic maps. Statistics defining the mean and standard deviation of each rock type are presented as listings in Volume I of this report. The departure of the data from its corresponding mean rock type is computed in terms of standard deviation units and is presented graphically as anomaly maps in Volume II and as computer listings in microfiche form in Volume I. Profiles of the normalized averaged data are contained in Volume II, and include traces of the potassium, uranium and thorium count rates, corresponding ratios, and several ancilliary sensor data traces, magnetometer radio altimeter and barometric pressure height. A description of the local geology is provided, and a discussion of the magnetic and radiometric data is presented together with an evaluation of selected uranium anomalies. (ERA citation 05:014896)

GJBX-39(80)(V.1) PC **A04**/MF **A01**
EG and G GeoMetrics, Sunnyvale, CA.
Aerial gamma Ray and Magnetic Survey: Minnesota Project, the Alpena, Blind River, Cheboygan, Escanaba, and Sault Sainte Marie Quadrangles of Michigan and Wisconsin. Final Report.
Feb 80, 69p
Contract EY-76-C-13-1664

During the month of September, 1979, EG and G geoMetrics collected 2,547 line miles of high sensitivity airborne radiometric and magnetic data in the states of Michigan and Wisconsin in five 1 exp 0 x 2 exp 0 NTMS quadrangles. This project is part of the Department of Energy's National Uranium Resource Evaluation Program. All radiometric and magnetic data were fully correcthed and interpreted by geoMetrics and are presented as four Volumes (one Volume I and three Volume II's). The study area is dominated by Pleistocene glacial debris. Underlying sediments of the Michigan Basin are predominantly limestone and dolomites of Ordovician through Devonian age. No uranium deposits are known in this region, but major uranium-producing areas lie just north of the project area in Precambrian quartz-pebble conglomerates. (ERA citation 05:014900)

INKA-Conf-79-275-001
PC **A03**/MF **A01**
Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.).
Lecture Meeting on Cutting Technology and Costs of Roadway Drivage with Two-Slice Heading Machines.
V. Mertens. 1979, 32p CONF-790165-1
In German.Lecture meeting on cutting technology and costs of roadway drivage with two-slice roadheaders, Bochum, F.R. Germany, 18 Jan 1979.
U.S. Sales Only.

The paper deals with the fields of application of two-slice heading machines, the improvements in cutting technology, and the costs of roadway drivage with two-slice heading machines. (ERA citation 05:013010)

LA-8222-HDR PC **A04**/MF **A01**
Los Alamos Scientific Lab., NM.
Bibliography of the Geological and Geophysical Aspects of Hot Dry Rock Geothermal Resources.
G. Heiken, and S. Sayer. Feb 80, 52p
Contract W-7405-ENG-36

This is the first issue of an annual compilation of references that are useful to the exploration, understanding and development of the hot dry rock geothermal resource. (ERA citation 05:017613)

LBL-7090 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Kinetic Equations and Type Curves for Predicting the Precipitation of Amorphous Silica from Geothermal Brines.
O. Weres, A. W. Yee, and L. Tsao. Aug 78, 8p
CONF-790108-5
Contract W-7405-ENG-48
1979 SPE international symposium on oilfield and geothermal chemistry, Houston, TX, USA, 22 Jan 1979.

The kinetics of amorphous silica precipitation from aqueous solution up to 100 exp 0 C and containing up to 1M NaCl were studied experimentally. Em-

pirical equations for the rate of molecular deposition on surfaces as a function of temperature, dissolved silica concentration, pH and salinity are presented. Empirical type curves which depict the decrease in dissolved silica concentration through homogeneous nucleation of colloidal silica are also presented. Two practical examples related to geothermal practice are given. (ERA citation 05:017651)

METC-8392-T1 PC **A15**/MF **A01**
Ingersoll-Rand Research, Inc., Princeton, NJ.
Enhanced Recovery by Injection of Treated Exhaust Gases from Existing Engines. Phase I Report, September 21, 1978-July 31, 1979.
R. A. Worthen, W. F. Pirtle, B. I. V. Dussan, E. Treible, and W. Gavigan. Jul 79, 345p
Contract EW-78-C-21-8392

The inert gas system being developed under DOE contract produces a non-corrosive gas consisting of approximately 88% nitrogen, 12% carbon dioxide, to be used for oil and gas field enhanced recovery programs. The system treats the engine exhaust of oil field engines which power the compressors for injecting the inert gas into the underground formations. In Phase I the potential of the system to increase oil and gas production was studied, a technical feasibility study done, and the designs of the component and pilot plant test stands developed. The major components of the system were evaluated and a thermal reactor designed for testing. In addition, a study of the system economics was made in order to estimate the cost of the inert gas. It is concluded that inert gas has the potential to add 3.3 billion barrels of oil to reserves and to increase production of natural gas by 10 trillion cubic feet. Technically, it is concluded that there are no significant barriers to development of the system. It is recommended that the program proceed to Phase II so that operating data can be developed to provide the basis for further evaluations of the commercial attractiveness of the system with regard to economics and reliability. (ERA citation 05:014768)

PB80-176597 PC **A99**/MF **A01**
Pennsylvania State Univ., University Park. Dept. of Mineral Economics.
Regulation of the Coal Industry-Health and Safety, Surface Mining and Other Issues. Parts I and II,
Richard L. Gordon, Charles B. Manula, and R. V. Ramani. 1979, 703p NSF/RA-790384
Grant NSF-APR76-18486
See also Part 3, PB80-176605.

Efforts to appraise impacts of the Coal Mine Health and Safety Act (CMHSA) of 1949 and surface mining regulations are reviewed. Also, an overview of numerous policies restricting the production and use of coal is presented. The effects of CMHSA on output were appraised by three methods, all of which indicate that CMHSA has reduced productivity significantly and concurrently raised coal mining costs 20 to 30 percent. Regression analyses demonstrate that costs appear to be five to twenty times higher than safety benefits. Data on potential health benefits suggest that they are unlikely to be great enough to raise benefits to equal costs. Hence, CMHSA advocates must show that benefit estimates are seriously understated. Analysis of surface mining regulations demonstrates that unless estimates of aesthetic benefits are grossly underestimated, surface mining reclamation entails costs which far exceed benefits. Global implications of these studies are not easily determined. A simulation study discusses health and safety regulations. A case study of a western strip mine provides extensive data which may or may not be representative. Overall, the conclusion is that the cost effectiveness of surface mining regulations is questionable.

PB80-176605 PC **A10**/MF **A01**
Pennsylvania State Univ., University Park. Dept. of Mineral Economics.
Big Sky Coal Mine - A Mine-Site Study of Benefits and Costs of Reclaiming Surface-Mined Land in the West. Part III,
Edward L. Julian. 1979, 202p NSF/RA-790385
Grant NSF-APR76-18486
See also Parts 1 and 2, PB80-176597.

The benefit-cost ratio of western coal reclamation is examined. Rising prices of imported crude oil have spurred significant expansion of western coal production to increase domestic sources of energy. This in turn has raised concerns about environmental impacts with resultant state laws requiring reclamation of mined land. Standard benefit-cost analysis studies provide insight into the absolute and relative size of benefits and costs of reclaiming surface mined western coal land using a case study of the Big Sky Mine in southeast Montana. This report presents the project's rationale, problems, and objectives. Several analyses of benefits and costs of reclamation are reviewed. The environment at Big Sky Mine is described and the laws and regulations affecting the mine are cited. Procedures and costs of reclamation at the mine are discussed, and the valuation methodologies of outdoor recreation and recreational benefits are examined and estimated. Benefits and costs are compared with respect to both priority and social benefits. The summary, conclusion, and implications of the research are presented.

PB80-178296 PC **A04**/MF **A01**
Maryland Univ., College Park. Photomechanics Lab.
Improvements in Efficiency for the Quarry Industry: An Investigation into Delay Blasting,
W. L. Fourney, D. B. Barker, and D. C. Holloway. Feb 80, 52p NSF/RA-800056
Grants NSF-DAR77-05171, NSF-DAR78-18008

This report summarizes an experimental program designed to determine the role of stress waves in a flawed media. The aim is to provide a more accurate representation of fundamental mechanisms of rock fragmentation due to the detonation of explosives. The program uses dynamic photoelasticity, dynamic holography, and high speed photography in laboratory models of plastics and rocks. Fragmentation mechanisms are first identified for homogeneous models of infinite extent and then for situations in which boundaries are in close proximity to detonated boreholes. Large block testing of limestone samples was conducted. It was discovered that serious inaccuracies existed in times of detonation of blasting caps commercially manufactured in the U.S. Also, the study identifies a new mechanism of fragmentation traceable to the shear component of stress in the outgoing compressive wave peak. This mechanism could account for the majority of fragmentation that occurs in a quarry blasting operation. The report includes numerous tables, diagrams, and references.

PB80-178890 PC **A14**/MF **A01**
MB Associates, San Ramon, CA.
Mine Materials Handling Vehicle (MMHV).
Open file rept. May 74-Dec 77,
A. L. Foote, and J. S. Schaefer. 18 Aug 78, 308p BUMINES-OFR-59-80
Grant H0242015

The purpose of this investigation was to develop a mechanical device that could safely perform handling tasks that are normally done manually in underground bituminous coal mines. The report discusses studies leading to construction of a battery-operated, three-wheel vehicle with a 6 degrees of freedom manipulator. Supportive design studies included collection and analysis of production, manual functions, and injury data on the underground bituminous coal mining industry. Transfer tasks in section storage and working places were the prime candidates for mechanical handling. Functional specifications were developed for two handling devices (one to handle existing unit loads and one to handle repackaged unit loads) and for a vehicle to mount the handling device. Design concepts f0r nine different handling devices were developed and a cost-benefit evaluation was made for each. Detail design, capital and operating costs, and method improvement savings data were developed for two-battery-operated vehicles and for two different manipulators. The three-wheel vehicle with anthropomorphic manipulator was chosen for development.

PB80-179187 PC **A03**/MF **A01**
Leeds, Hill and Jewett, Inc., San Francisco, CA.
A Program Plan for Determining Optimum Roof Bolt Tension. Theory and Application of Rock Reinforcement Systems in Coal Mines. Volume 2. General Bibliography.
Open file rept. (Final), Oct 77-Mar 79,
T. A. Lang, J. A. Bischoff, and P. L. Wagner. Mar 79, 43p BUMINES-OFR-60(2)-80
Contract J0285006
See also Volume 1, PB80-179195.

The objective of this investigation was to develop a program plan of analytical studies and tests to determine (1) the optimum installation tension of a coal mine roof bolt, (2) the most valid bolt support theory or theories, and (3) the most valid roof failure theory or theories. Volume 2 contains the bibliography.

PB80-179195 PC **A12**/MF **A01**
Leeds, Hill and Jewett, Inc., San Francisco, CA.
A Program Plan for Determining Optimum Roof Bolt Tension. Theory and Application of Rock Reinforcement Systems in Coal Mines. Volume 1.
Open file rept. (Final), Oct 77-Mar 79,
T. A. Lang, J. A. Bischoff, and P. L. Wagner. Mar 79, 255p BUMINES-OFR-60(1)-80
Contract J0285006
See also Volume 2, PB80-179187.Color illustrations reproduced in black and white.

The objective of this investigation was to develop a program plan of analtyical studies and tests to determine (1) the optimum installation tension of a coal mine roof bolt, (2) the most valid bolt support theory or theories, and (3) the most valid roof failure theory or theories. On this basis, a comprehensive literature search was made and significant material dealing with coal mine roof behavior, roof bolting, and roof support was collected, reviewed, classified, and analyzed. Emphasis was given to the influence of rock reinforcement on the control of deformation, stress field modification, and mine roof stability. An assessment was made of the effect of various parameters including bolt tension, bolt pattern, and time of installation on the effectiveness of rock reinforcement systems, and equations were developed for bolt tension as a function of these parameters and rock properties. From these studies, a major program plan of tests and studies was developed to verify and validate the most tenable theories of roof behavior and roof support and to determine optimum bolt installation tension.

PB80-180052 PC **A10**/MF **A01**
Michigan Technological Univ., Houghton. Dept. of Mechanical Engineering and Engineering Mechanics.
Design Criteria for Roof Bolting Plans Using Fully Resin-Grouted Nontensioned Bolts to Reinforce Bedded Mine Roof. Volume I. Executive Summary and Literature Review.
Final rept. 22 Jul 75-22 Jul 77,
J. C. Gerdeen, V. W. Snyder, G. L. Vieghlahn, and J. Parker. 22 Jul 77, 208p BUMINES-OFR-46(1)-80
Contract J0366004
See also Volume 2, PB80-180060.
Also available in set of 5 reports PC E18, PB80-180045.

The objective of this investigation is to identify factors governing the effectiveness of roof bolting systems using fully resin-grouted non-tensioned bolts for reinforcement of bedded mine roofs and to develop design criteria for such plans. Volume I presents a summary of work done, a background study, and a literature review on resin bolting, mine analysis, and coal and rock properties. Strength and stiffness properties of resin bolts under both axial and shear loadings are considered in detail. Mechanisms of roof reinforcement using resin bolts are reviewed. Associated mine analyses including the effects of in situ conditions are included.

PB80-180060 PC **A08**/MF **A01**
Michigan Technological Univ., Houghton. Dept. of Mechanical Engineering and Engineering Mechanics.
Design Criteria for Roof Bolting Plans Using Fully Resin-Grouted Nontensioned Bolts to Reinforce Bedded Mine Roof. Volume II. Field Survey.
Final rept. 22 Jul 75-22 Jul 77,
J. G. Gerdeen, V. W. Snyder, G. L. Viegelahn, and J. Parker. 22 Jul 77, 167p BUMINES-OFR-46(2)-80
Contract J0366004

See also Volume 1, PB80-180052 and Volume 3, PB80-180078.
Also available in set of 5 reports PC E18, PB80-180045.

The final report consists of five volumes. The first section of this volume deals with visits to 35 underground coal mines, a rocksalt mine, a deep potash mine and a fireclay mine. The purpose of the visits was to observe first-hand a wide variety of roof-control problems, the use of resin bolts to overcome those problems, and the shortcomings of resin bolting. The second, third and fourth sections of this volume describe visits to the manufacturers of resin, and to universities and other research facilities. The purpose of these visits was to establish contacts and to exchange ideas on the principles of resin bolting. This report presents field surveys obtained during the visits.

PB80-180078 PC **A07**/MF **A01**
Michigan Technological Univ., Houghton. Dept. of Mechanical Engineering and Engineering Mechanics.
Design Criteria for Roof Bolting Plans Using Fully Resin-Grouted Nontensioned Bolts to Reinforce Bedded Mine Roof. Volume III. Experimental Model Studies.
Final rept. 22 Jul 75-22 Jul 77,
J. C. Gerdeen, V. W. Snyder, G. L. Viegelahn, and J. Parker. 22 Jul 77, 128p BUMINES-OFR-46(3)-80
Contract J0366004
See also Volume 2, PB80-180060 and Volume 4, PB80-180086.
Also available in set of 5 reports PC E18, PB80-180045.

The report presents experiments that were run on adhesion of resin to rock, pull tests of resin anchored rebars, and bending tests of thinly laminated beams reinforced with resin bolts. The effects of hole diameter, bolt diameter, resin annulus, and hole condition on anchorage, and the effect of bolt spacing on beam bending were determined.

PB80-180086 PC **A05**/MF **A01**
Michigan Technological Univ., Houghton. Dept. of Mechanical Engineering and Engineering Mechanics.
Design Criteria for Roof Bolting Plans Using Fully Resin-Grouted Nontensioned Bolts to Reinforce Bedded Mine Roof. Volume IV. Theoretical Analysis.
Final rept. 22 Jul 75-22 Jul 77,
J. C. Gerdeen, V. W. Snyder, G. L. Viegelahn, and J. Parker. 22 Jul 77, 81p BUMINES-OFR-46(4)-80
Contract J0366004
See also Volume 3, PB80-180078 and Volume 5, PB80-180094.
Also available in set of 5 reports PC E18, PB80-180045.

Investigations were conducted on axial and shear loading of resin bolts, the Voussoir rock arch, beam building, angle bolted roof trusses, jointed roofs, bolting of sloping joints, and stresses in roofs due to moisture changes. The analyses described here are supplemental to those described in Volume I.

PB80-180094 PC **A07**/MF **A01**
Michigan Technological Univ., Houghton. Dept. of Mechanical Engineering and Engineering Mechanics.
Design Criteria for Roof Bolting Plans Using Fully Resin-Grouted Nontensioned Bolts to Reinforce Bedded Mine Roof. Volume V. Synthesis and Design Criteria.
Final rept. 22 Jul 75-22 Jul 77,
J. C. Gerdeen, V. W. Snyder, G. L. Viegelahn, and J. Parker. 22 Jul 77, 129p BUMINES-OFR-46(5)-80
Contract J0366004
See also Volume 4, PB80-180086.
Also available in set of 5 reports PC E18, PB80-180045.

The design synthesis and the establishment of design criteria presented in this report is based on a critical review of the first four volumes of the report. The design synthesis points out some practical aspects of roof control using bolting but a definitive design criteria was not obtained. The current Code of Federal Regulations Title 30, Part 75, is examined and recommended modifications are given.

PB80-181217 PC **A02**/MF **A01**
Bureau of Mines, Denver, CO. Denver Research Center.
Long-Term Response of a Coal Mine Roof to Time Lapse Between Exposure and Support.
Technical progress rept. 1976-79,
Daryl E. Radcliffe, and Raymond M. Stateham. 1980, 17p BUMINES-TPR-110

The Bureau of Mines, as part of an agreement with the Bear Coal Co., Somerset, Colo., evaluated the response of a coal mine roof to time lapse. Time lapse, the interval between exposure and support of the roof, was studied using both instrumentation and statistics. Instrumentation studies were designed to equate displacement and rates of displacement with areas of roof left unsupported from 15 minutes to more than 4 days. A statistical study was completed to compare roof fall occurrence with time lapse intervals encountered during normal room-and-pillar mining. Results from this investigation show time lapse, in the Bear mine, to be insignificant with respect to roof stability after installation of permanent support.

PB80-182116 PC **A05**/MF **A01**
Washington State Univ., Pullman. Dept. of Geology.
Development of a Reliable Method for Evaluation of Deep Sea Manganese Module Deposits.
Open file rept. (Final), 30 Sep 77-20 Sep 78,
R. H. Fewkes, W. D. McFarland, W. R. Reinhart, and R. K. Sorem. 12 Jan 79, 94p BUMINES-OFR-64-80
Contract G0274013

Methods of estimating manganese nodule grade and concentration were investigated using data from a well-explored east-central Pacific manganese nodule deposit. Bulk chemical analyses of 159 nodules recovered from 21 box cores show that the range in metal values between nodules from a single box core is commonly small but may be greater than the range in mean metal content of nodules from widely separated box cores. The metal exhibiting the greatest variability in the 21 box cores is Zn, followed in decreasing order by Cu, Mn, Co, Ni, and Fe. Approximately half of the box cores required analyses of 11 nodules or more to predict metal content within plus or minus 10 percent of the mean value.

PB80-182959 PC **A10**/MF **A01**
Battelle Columbus Labs., OH.
Hoist Rope Lubrication Criteria.
Final rept. Nov 76-Jul 78,
Richard L. Jentgen. Jul 78, 209p BUMINES-OFR-65-80
Contract J0377011

The objective of this report was to search and organize world literature and industry practices connected with lubricants and lubricant-application techniques for wire ropes used in underground mine hoists. A secondary objective included the development of a rationale for selection of hoist-rope lubricants. Actual experiences in mines were concluded to offer a variety of lubricants and techniques that could be emulated by others in an effort to achieve improved hoist-rope reliability and life. When most of these lubricants were evaluated in the laboratory, it was found that they ranked highest in the majority of tests related to function. This led to the recommendation that low-viscosity oil-type lubricants are the materials of choice with which to maintain hoist ropes. A prototype specification covering the recommended lubricants was formed. The report contains conclusions and detailed recommendations resulting from each task including suggestions for needed research.

PNL-3072 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Long-Term Supply Curves for Geothermal Energy: The Impacts of Technology.
L. L. Fassbender, and C. H. Bloomster. Jan 80, 94p
Contract EY-76-C-06-1830

Near-term and long-term supply curves are presented for electric applications of geothermal energy. The GEOCOST model was used to determine the present and future energy production costs for the high-temperature and intermediate-temperature hydrothermal resources identified by the USGS The long-term supply curves illustrate the potential shifts in the near-term supply curve which would result from certain technology improvements currently being pursued. Programs with the most significant potential impacts are those which result in large reductions in drilling cost, those which lead to development of commercial high capacity downhole pumps, and those which lead to large increases in the plant capacity factor. Curves were drawn to show the impacts of individual technology improvements and also to show the cumulative impacts of combinations of technological advances expected to be achieved by 1982 and 1985. Successful completion of all the programs evaluated would result in a cumulative cost reduction of $90 billion (not discounted) in electrical generating costs from the identified hydrothermal resources. (ERA citation 05:015471)

SAN-1309-3 PC **A07**/MF **A01**
System Development Corp., Santa Monica, CA.
Mechanical Refrigerator for Deep Well Sonde Electronics, Phase II. Final Report.
J. Fukuzawa. 9 Apr 79, 127p
Contract EY-76-C-03-1309

The system is based on a vapor cycle refrigeration system with the usual compressor, evaporator and condenser. It is designed to operate between a condensing temperature of 275 exp 0 C and an evaporating temperature of 125 exp 0 C. Water vapor is the refrigerant. The compressor is an electric motor driven three-stage positive displacement machine. The design output of the refrigerator is 50 watts cooling. The work described covers the development of the compressor with associated component development tests. The compressor was tested in a loop simulating downhole conditions. Short duration runs were accomplished where study state conditions of refrigerant and lubricant flows were established. However, because of various component failures, sustained operations, greater than 6 hours at a time, could not be made. (The design goal was 100 hours.). (ERA citation 05:017618)

SAND-79-7125 PC **A05**/MF **A01**
Terra Tek, Inc., Salt Lake City, UT.
Program for the Improvement of Downhole Drilling-Motor Bearings and Seals. Phase III, Part 2: Final Report.
Mar 80, 87p
Contract EY-76-C-04-0789

Six months of activity to improve downhole drilling-motor bearings and seals for geothermal applications are reported. The following are covered: seal testing and evaluation, bearing-seal package testing and evaluation, lubricant testing and evaluation, and program status, plans and schedule. (ERA citation 05:017643)

8J. Physical Oceanography

AD-A083 673/4 PC **A02**/MF **A01**
Woods Hole Oceanographic Institution MA
Effects of Variations in Eddy Diffusivity on Property Distributions in the Oceans,
Laurence Armi. 10 Aug 78, 22p Rept nos. WHOI-79-103, WHOI-CONTRIB-4209
Contract N00014-76-C-0197, Grant NSF-OCE76-81190
Pub. in Jnl. of Marine Research, v37 n3 p515-529 1979.

No abstract available.

AD-A083 855/7 PC **A03**/MF **A01**
Naval Postgraduate School Monterey CA
First-Generation Numerical Ocean Prediction Models -- Goal for the 1980's.
Rept. for Oct 78-Dec 79,
Russell L. Elsberry, and Roland W. Garwood, Jr. Dec 79, 43p Rept no. NPS-63-79-007

Using the experience of numerical weather prediction during the 1950's and 1960's as a model, a case is presented for development during the 1980's of an ocean prediction capability. Examples selected from recent research at the Naval Post-

graduate School are used to illustrate some aspects of the theoretical background, representation of physical processes, observational-support systems and the justification for a first-generation ocean prediction system. (Author)

AD-A083 876/3 PC **A03**/MF **A01**
Scripps Institution of Oceanography La Jolla CA
On the Contribution of the Mediterranean Sea Outflow to the Norwegian-Greenland Sea,
Joseph L. Reid. 2 Nov 78, 28p
Contract N00014-75-C-0152
Pub. in Deep-Sea Research, v26A, p1199-1223 1979.

No abstract available.

N80-22758/0 PC **A03**/MF **A01**
Computer Sciences Corp., Wallops Island, VA.
Determining Sea-Ice Boundaries and Ice Roughness Using Geos-3 Altimeter Data.
R. E. Dwyer, and R. H. Godin. Mar 80, 49p
NASA-CR-156862

The GEOS-3 satellite and radar altimeter instrumentation are described, detailing the ice boundary discrimination technique utilized and presenting an analyses of the GEOS-3 data with respect to satellite visual and IR imagery. A brief description of the GEOS-3 real time data system is also given.

N80-22951/1 PC **A03**/MF **A01**
Metallgesellschaft, A.G., Frankfurt am Main (Germany, F.R.). Chemisches Lab./Analytik.
Analytical Investigation of the Growth Layers of Pacific Ocean Manganese Nodules on a Semi-Micro Scale.
Final Report.
H. M. Lueschow. Dec 78, 44p BMFT-FB-M-78-04
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. Und Technol.

X-ray fluorescence analysis was used to examine the chemical composition of manganese nodules from the Pacific Ocean floor. Nodules found close to each other were significantly different in the structure of their various layers. Conclusions pertaining to the origin of the nodules are discussed.

PB80-811235 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Remote Sensing of the Ocean. Physical, Chemical, and Geologic Properties. 1976-May, 1979 (Citations from the NTIS Data Base).
Rept. for 1976-May 80,
Robena J. Brown. Jun 80, 123p
Supersedes NTIS/PS-79/0585 and NTIS/PS-78/0563. Updates COM-73-11676. See also 1970-1975, NTIS/PS-78/0562.

The studies describe remote sensing methods as they are applied to ocean temperature, sea ice, marine biology, and sound and light transmission. Techniques of measurement using radiometry, microwave spectroscopy, radar systems, infrared spectroscopy, and photography are described. These measurements are made from both aircraft and satellites. (This updated bibliography contains 116 abstracts, 17 of which are new entries to the previous edition.)

8K. Seismology

SAND-79-2026C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Digital Simulation of a Seismic System.
D. R. Breding. 1980, 17p CONF-800502-8
Contract EY-76-C-04-0789
26. international instrumentation symposium, Seattle, WA, USA, 5 May 1980.

A seismic observatory is currenty under development. The unique features of this observatory are unattended operation, low power, digital output, satellite transmission, and a method of verifying the authenticity of the data received. As a part of the program the analog seismometers and filters were simulated on a computer. A short discussion of digital simulation in general is followed by an explanation of the specific method chosen. The reasons why this simulation was chosen and the accuracy of the simulation is also discussed. Although a specific seismic system is discussed the methods employed apply to analog transfer functions in general. 13 figures. (ERA citation 05:018096)

8L. Snow, Ice, and Permafrost

AD-A083 644/5 PC **A03**/MF **A01**
Kansas Univ/Center for Research Inc Lawrence Remote Sensing Lab
Intermediate Results of the Radar Backscatter Study of Sea Ice in the Beaufort Sea.
Technical rept.,
C. V. Delker, R. G. Onstott, and R. K. Moore.
Mar 80, 48p
Contract N00014-76-C-1105

As a part of the Beaufort Sea segment of the Surveillance Satellite Project (SURSAT), a team of investigators from the University of Kansas conducted experiments to obtain quantitative measurements of radar backscatter from sea ice during the month of March 1979. Thick first-year sea ice, thin first-year sea ice, and an inland fresh water lake were studied using a surface-based FM-CW scatterometer that swept from 1.1 - 1.9 GHz and 8.5 - 17.5 GHz with angles of incidence (from vertical) of 10 deg. to 75 deg and various linear polarizations. Measurements of thick first-year sea ice, thin first-year sea ice, brackish sea ice, and an inland freshwater lake were also made using a helicopter-borne FM-CW scatterometer that swept from 8.5 - 17.5 GHz with incidence angles of 20 deg. to 60 deg. and VV polarization only. The 1.1 - 1.9 GHz measurements show that lake ice can be distinguished from thick and thin first-year sea ice. The radar cross-sections of thick and thin first-year sea ice are not significantly different for incidence angles less than 45 deg. The 8.5 - 17.5 GHz measurements indicate that lake ice can be distinguished from the other types in all cases. Thick and thin first-year sea ice are separated by a 2 - 4 dB difference for incidence angles greater than 40 deg. The effect of snow cover on the return from lake ice was also investigated with dramatic results.

8M. Soil Mechanics

AD-A083 972/0 MF **A01**
Cambridge Univ (England) Dept of Civil Engineering
Centrifugal Modelling of Soil Structures. Part II. The Centrifugal Modelling of Dynamic Soil-Structure Interaction and Earthquake Behavior.
Final technical rept. 6 May 76-5 May 79,
Derek Victor Morris, and Andrew N. Schofield.
Jun 79, 222p
Grant DA-ERO-76-G-040
Doctoral thesis. See also Part 3, AD-A084 049.
Availability: Microfiche copies only.

Accurate model tests of problems in soil mechanics may be carried out by the technique of centrifugal modelling, which preserves the correct magnitude and distribution of stress in the soil. There is a consistent set of rules to relate the behaviour of a full-size prototype to the behaviour of a model, not only for static tests, but also for dynamic events. The object of this investigation was, firstly, to show that dynamic modelling was possible, and secondly, to use the technique for some initial studies of soil-structure dynamic interaction and earthquake motion. The project used the geotechnical centrifuge at Cambridge University, England, and this will accept packages of almost one tonne in mass at a maximum acceleration of 155 g.

AD-A084 048/8 PC **A10**/MF **A01**
Cambridge Univ (England) Dept of Civil Engineering
Centrifugal Modelling of Soil Structures. Part I. Centrifugal Modelling of Slope Failures.
Final technical rept. 6 May 76-5 May 79,
Deborah Janet Goodings, and Andrew N. Schofield. Mar 79, 208p
Grant DA-ERO-76-G-040
Doctoral thesis. See also Part 2, AD-A083 972.

This research investigated slope failure in two prototype soil materials using the technique of reduced scale centrifugal modelling. In nineteen coal mine waste embankment dam models, throughout which the soil particle size distribution was altered for modelling of different prototype soil conditions, three classes of failure were observed: intact slope failure in response to throughflow conditions, failure by erosion, and retrogressive rate of construction failure. The importance of particle size distribution, of embankment preparation by compaction in lifts, of a clay foundation layer, and of the inclusion of highly permeable sections in the embankment, both drained and undrained, were all studied in the course of experiments. Conventional methods of prediction of slope stability and erosion were applied to the models. The scaling laws for centrifugal modelling of water movement were examined, and the requirements for reduced scale modelling of seepage and erosion were found to be mutually incompatible.

N80-22755/6 PC **A07**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Ralph M. Parsons Lab. for Water Resources and Hydrodynamics.
Estimation of Effective Hydrologic Properties of Soils from Observations of Vegetation Density.
T. E. Tellers, and P. S. Eagleson. Mar 80, 126p
NASA-CR-163002, R80-7
Grant NSG-5306

A one-dimensional model of the annual water balance is reviewed. Improvements are made in the method of calculating the bare soil component of evaporation, and in the way surface retention is handled. A natural selection hypothesis, which specifies the equilibrium vegetation density for a given, water limited, climate soil system, is verified through comparisons with observed data. Comparison of CDF's of annual basin yield derived using these soil properties with observed CDF's provides verification of the soil-selection procedure. This method of parameterization of the land surface is useful with global circulation models, enabling them to account for both the nonlinearity in the relationship between soil moisture flux and soil moisture concentration, and the variability of soil properties from place to place over the Earth's surface.

N80-22756/4 PC **A05**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Survey of Methods for Soil Moisture Determination.
T. J. Schmugge, T. J. Jackson, and H. L. Mckim.
Nov 79, 76p NASA-TM-80658
Submitted for Publication. Presented at the Pecora Symp., Sioux Falls, S.D., Jun. 1979.

Existing and proposed methods for soil moisture determination are discussed. These include: (1) in situ investigations including gravimetric, nuclear, and electromagnetic techniques; (2) remote sensing approaches that use the reflected solar, thermal infrared, and microwave portions of the electromagnetic spectrum; and (3) soil physics models that track the behavior of water in the soil in response to meteorological inputs (precipitation) and demands (evapotranspiration). The capacities of these approaches to satisfy various user needs for soil moisture information vary from application to application, but a conceptual scheme for merging these approaches into integrated systems to provide soil moisture information is proposed that has the potential for meeting various application requirements.

PB80-177249 PC **A10**/MF **A01**
California State Dept. of Transportation, Sacramento. Office of Transportation Lab.
Long Term Studies of Consolidation and Shear Strength Increases in Soft Foundation Soil.
Final rept.,
Jerry C. Chang. Nov 79, 203p TL-632773,
FHWA/CA/TL-79/21

This report summarizes the state-of-the-art developments in analysis of consolidation and shear strength increase in soft foundation soil. Five case studies of the field performance of soft soil foundations under highway embankments were analyzed and reported. It was found that the long-term gain in shear strength ranged from three to five times the initial strength prior to loading. The shear

strength gain in soft soil foundations may be predicted with reasonable accuracy based on field measurements of the dissipations in excess pore water pressure or settlement data. A method for developing construction control charts based on the theory of soil consolidation, shear strength gain, and foundation stability analysis, is presented.

PB80-181704 PC **A07**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
Laboratory Behavior of an Artificial Soil,
S. Sture, C. S. Desai, and J. V. Perumpral. Mar 80, 130p VPI-E-80-12

The results of true and conventional triaxial shear tests on an artificial soil are presented. The effects of initial density, mean confinement and stress path history on the material's constitutive behavior have been studied. The tests were performed with two true triaxial apparatuses. Conventional and unconventional straight line stress paths including isotropic compression were followed. Proportional and nonproportional stress paths tests were investigated as well. The influence of stress path strength and deformability responses were explored. Analysis of the stress-strain and strength responses provided information for development of an elastic-work hardening plastic cap model.

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A083 682/5 PC **A07**/MF **A01**
Varian Associates Inc Palo Alto CA Solid State Lab
Noncoplanar High Power FET.
Final rept. Dec 74-Nov 78,
S. G. Bandy, D. M. Collins, D. R. Decker, J. H. Dully, and R. D. Fairman. Dec 79, 138p
Contract N00014-76-C-0303

Using a p+ substrate as the gate and employing low-doped V-grooves under the source and drain to reduce parasitic capacitances, a noncoplanar power FET was designed and fabricated which achieved submicron gate lengths with photolithography masks employing a resolution limit of several microns. Device performance was limited by low values of pinch-off voltage and gate breakdown voltage. Ion imlantation or diffusion should enable the breakdown voltage to be raised by virtue of separating the p-n junction from the growth interface.

AD-A083 836/7 PC **A07**/MF **A01**
Naval Postgraduate School Monterey CA
Spectral Domain Analysis of Fin-Line.
Master's thesis,
Paul Mark Shayda. Dec 79, 129p

An analysis of fin-line characteristics is presented. The dispersion characteristic and characteristic impedance of the structure are determined by the application of the spectral domain technique. Numerical results are presented and compared with known data for ridged waveguide, dielectric slab loaded waveguide and slotline. Excellent agreement has been obtained. Design curves are also presented for practical millimeter wave fin-line structures covering the 26.5 - 140Hz frequency range. (Author)

AD-A083 868/0 PC **A02**/MF **A01**
Rome Air Development Center Hanscom AFB MA Deputy for Electronic Technology
Geometric Analysis of Soft Errors and Oxide Damage Produced by Heavy Cosmic Rays and Alpha Particles,
John N. Bradford. 1979, 7p Rept no. RADC/ETR-80-0014
Pub. in IEEE Transactions on Nuclear Science, vNS-27 n1 p942-947 Feb 80.

No abstract available.

AD-A083 898/7 PC **A04**/MF **A01**
Defence Research Establishment Ottawa (Ontario)
Non-Linear Junction Characterization.
Technical note,
Myles R. McMillan. May 79, 63p Rept no. DREO-TN-79-7
Abstract in French.

The phenomena of non-linear junctions formed by contacting metal surfaces was investigated and a method to characterize these junctions is described. Normally linear components, such as points of contact, can become nonlinear elements. These can occur in coupling hardware of coaxial transmission lines, in flanged joints of wave guides and in other waveguide components that are bolted together. Chemical compounds build up on metal contact surfaces exposed to the atmosphere. The compounds, oxides and sulphides for example, are semiconductive and tend to increase contact resistance. They have a non-linear current-voltage characteristic that can be used to characterize Metal-Oxide-Metal junctions by nonlinear measurements. When a pure sinusoidal current flows through a component (point of contact) the voltage across it is distorted by any nonlinearities present. The distorted voltage can be considered the sum of a fundamental frequency voltage and a number of voltages at harmonic frequencies. The magnitude of these harmonic voltages can serve as a measure of the nonlinearity present in the contact. For convenience, the third harmonic is usually chosen since it has the largest magnitude and therefore is easiest to measure.

AD-A083 899/5 PC **A05**/MF **A01**
Defence Research Establishment Ottawa (Ontario)
A Comprehensive Review of Travelling-Wave Tube Technology.
Technical note,
Robert Luiz. Nov 79, 80p Rept no. DREO-TN-80-1
Abstract in French.

A review of TWT technology is presented comparing selected aspects and design procedures relative to application. The general theory of operation of various types of TWT designs is discussed together with a review of principles of their construction and trade offs. The travelling-wave tube (TWT) was invented by R. Kompfner in 1943, and the principle of TWT amplification was demonstrated by him at Birmingham University in the same year. A small signal theory of this device was extensively developed by J.R. Pierce. The TWT has been constructed to operate at many wavelengths, ranging from one meter to one millimetre. It has found wide application primarily because at any given frequency or power level, it offers much more bandwidth than any of its competitors. The travelling-wave tube, though structurally simple, is a 'Constructred Complication'. Because of its structural simplicity, TWTs have been built to operate at frequencies as high as 50 GHz. Modern requirements for TWT amplifiers often call for very wide bandwidths combined with high power output. For any practical application and ideal TWT is seldom available as an 'off-the-shelf' item mainly because more than two dozen independent parameters are required in order to completely describe the tube.

AD-A084 046/2 PC **A03**/MF **A01**
Varian Associates Inc Palo Alto CA
Contiguous Gridded Gun Development Program.
Final technical rept. Mar 78-Aug 79,
Glen Huffman. Mar 80, 32p RADC-TR-80-51
Contract F30602-78-C-0123

A gridded gun, suitable for operating megawatt level linear beam tubes, has been designed and tested at lower levels in a beam analyzer. The new gun features a shadow grid in contact with the cathode surface. A major goal was to achieve low control grid interception. Guns with contiguous grid systems are in common use in low and medium power tubes. The purpose of this program was to extend existing lower power gridded gun technology to the megawatt level. The basic gun parameters including beam diameter, voltage, current, perveance and grid operating voltage are all quite conservative and readily achievable in an 83 kV gun. The most critical requirement was that the maximum outer diameter of the gun assembly not exceed 5.48 inches. This limit forced a compromise between cathode emission density and high voltage gradients and dictated the use of a tungsten matrix cathode. A scale model gun was built and tested in a beam analyzer. After modification to the design, a full-scale gun was built and also tested in the beam analyzer. Extrapolations from the beam analyzer test data show that the gun should meet all performance objectives at full power except for heater power and grid bias voltage. The intercepted control grid current cannot be accurately estimated for full power operation, but it is believed that it will be less than the 40 milliamps specified.

IPP-4/167 PC **A03**/MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).
Calculation of the Nodal Forces in the 20-Node Isoparametric Three-Dimensional Solid Element by the SHAPE Computer Program.
H. Gorenflo, and O. Jandl. Mar 78, 43p IPP-III/43
U.S. Sales Only.

To calculate mechanical stress and displacement by the finite element method, the forces acting on the nodes of the volume grid must be known. This report describes the calculation of these nodal forces for the 20-node isoparametric solid element. The nodal forces are calculated from the force density values by using the shape functions, which describe the displacement field within an element. This method is the most accurate one for calculating the forces on the nodes of an element. The program is based on the node numbering used in the finite element programs SOLID SAP IV and SOLID SAP V. A detailed description is given for the special case of toroidal D-coils. The magnetic force densities for this application are calculated with the computer program HEDO2. (Atomindex citation 10:421234)

N80-22597/2 PC **A05**/MF **A01**
Sprague Electric Co., North Adams, MA.
Study of Surge Current Effects on Solid Tantalum Capacitors.
Final Report.
20 Mar 80, 100p NASA-CR-161433
Contract NAS8-33424

Results are presented of a 2,000 hour cycled life test program conducted to determine the effect of short term surge current screening on approximately 47 micron f/volt solid tantalum capacitors. The format provides average values and standard deviations of the parameters, capacitance, dissipation factor, and equivalent series resistance at 120 Hz, 1KHz, abd 40 KHz.

N80-22598/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Improved Traveling Wave Tubes.
E. Buck. 1980, 15p NASA-TM-81479, E-415
Presented at Western Region Electronic Warfare Tech. Meeting, White Sands Missile, Range, N. Mex., 21-24 Apr. 1980; Sponsored by Assoc. Of Old Crows.

After a brief description of how a typical TWT works, multi-stage depressed collectors (MDC) are discussed. A quick method for computing the expected efficiency of a well engineered TWT is outlined to aid in estimating power supply needs. Applications of improved TWTs and a new power supply are suggested.

N80-22623/6 PC **A04**/MF **A01**
Siemens A.G., Munich (Germany, F.R.). Unternehmensbereicht Bauelemente.
Planar Transistors and Impatt Diodes with Ion Implantation.
Final Report.
H. Dorendorf, H. Glawischnig, L. Grasser, and J. Hammerschmitt. Nov 79, 60p BMFT-FB-T-79-16
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

Low frequency planar n-p-n and p-n-p transistors were developed using ion implantation of boron and phosphorus by a drive-in diffusion. The electrical parameters of the transistors are comparable with conventionally produced transistors. The noise figure was improved and production tolerances were reduced. Silicon avalanch diodes for the microwave range were fabricated with implant-

ed p-n junctions and tested for their high frequency characteristics. These diodes, made in an improved upside down technqiue, delivered output power of up to 40 mW at 30 GHz. Reverse leakage current and current carrying capacity were comparable to diffused structures.

PAT-APPL-6-136 858 PC **A02/MF A01**
Department of the Navy Washington DC
Blocking Feed through for Coaxial Cable.
Patent Application,
Robert F. Howarth. Filed 3 Apr 80, 11p AD-D007 170/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A coaxial cable is fed through a wall without introducing electrical reflections or otherwise compromising the cable's electrical integrity. A cylindrically-shaped housing having a cavity is inserted through an opening in the wall and is locked in place while an o-ring seals the juncture. An adhesive compound fills the cavity and adhesively engages an exposed length of cable shielding and the inner wall of the cavity. After the compound cures, a watertight interconnection and penetration of the wall is formed without compromising the cable's electrical integrity. (Author)

9B. Computers

AD-A083 706/2 PC **A08/MF A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
A Computer-Based Decision Analysis Support System.
Master's thesis,
Bruce W. Morlan. 6 Dec 79, 154p Rept no. AFIT/GOR/SM/79D-6

Decision analysis paradigms often involve hierarchies, and a computer program was created for use as an interactive aid for decision makers and analysts to use in manipulating these hierarchies. A stand alone user's guide, with a highly documented FORTRAN program listing are included. Also discussed are the sensitivity analysis algorithms and the tree manipulating algorithms. (Author)

AD-A083 727/8 PC **A02/MF A01**
Michigan State Univ East Lansing Dept of Computer Science
A Study of a Procedure for Reducing the Feature Set of Workload Data.
Final rept.,
Herman D. Hughes. Feb 80, 19p AFOSR-TR-80-0259
Grant AFOSR-78-3547

Workload models are extremely important for computer performance evaluation. The problem of feature reduction for the purpose of the formulation of workload models has received widespread attention. This paper briefly reviews existing schemes for feature selection and reduction, and proposes a feature reduction algorithm based on a linear decision-tree classifier. An example is presented to illustrate the use and validity of this algorithm. (Author)

AD-A083 729/4 PC **A03/MF A01**
Computer Corp of America Cambridge MA
Spatial Data Management System.
Quarterly research and development technical rept. 1 Sep-30 Nov 79,
David Kramlich, Christopher F. Herot, Richard Carling, and Mark Friedell. 30 Nov 79, 37p
Contract MDA903-78-C-0122, ARPA Order-3487
Original contains color plates: All DTIC/NTIS reproductions will be in black and white.

This report describes work on the design and implementation of a prototype Spatial Data Management System (SDMS). Spatial Data Management is a technique for storing and retrieving information which employs pictorial representations of data arranged on a collection of flat surfaces which the user can view on a color, raster-scan display. Tools are provided for interactively entering graphical and symbolic data, including a mechanism for generating graphical representations of existing, shared symbolic data bases. Several new features that increase the utility of the system were implemented. These are: a new statement in the modified query language of the underlying DBMS; extensions to the graphical editor; extensions to the module which manages objects in the graphical Data Space (GDS); and a terminal emulator to provide a text interface to SDMS.

AD-A083 776/5 PC **A02/MF A01**
Virginia Polytechnic Inst and State Univ Washington DC Dept of Computer Science
Line Printer Spooling on an ASCII Terminal.
Technical memo.,
Richard J. Orgass. 12 Apr 79, 8p VPI/SU-TM-79-2, AFOSR-TR-80-0280
Grant AFOSR-79-0021

A program to simulate an upper and lower case line printer on an ASCII terminal with a line length of at least 132 characters is described. The program assumes that the usual FORTRAN carriage control tape is mounted in the line printer. Carriage control for top of form (1) and skip one line (0) are supported but overprinting is not supported. The program is useful when a liner printer is not available or when an upper and lower case line printer is needed and only an upper case line printer is available. Potential users are warned that it takes a very long time to print a listing at 300 baud. (Author)

AD-A083 815/1 PC **A03/MF A01**
Wisconsin Univ-Madison Mathematics Research Center
Programming Language Facilities for Numerical Computation.
Technical summary rept.,
John R. Rice. Jan 80, 34p Rept no. MRC-TSR-2033
Contract DAAG29-75-C-0024

This is a working paper for IFIP Working Group 2.5 (Numerical Software) to stimulate discussion of a possible group project. The project is to describe the facilities in a programming language that make it useful for numerical computation. The facilities are classified and their importance measured. This paper presents a framework for this project and is an initial draft of the facility descriptions. The opinions and ratings contained here are those of the author and do not reflect a consensus of IFIP WG 2.5. (Author)

AD-A083 831/8 PC **A06/MF A01**
Naval Postgraduate School Monterey CA
A Microprocessor Development System for the Intel 8748 Microcomputer.
Master's thesis,
Theodore Clark Seward, Jr. Dec 79, 102p

A microprocessor development system (MDS) for the Intel 8748 microcomputer was designed and built around the Naval Postgraduate School's TRS-80 computer system. This MDS provides the capability to use the TRS-80 as an editor to write and edit 8748 mnemonic programs and store them on a magnetic disk. Also developed was an assembler to convert the user generated source program into object code. As a final step, a software driven hardware programmer has been constructed to enable the object code to be loaded into the Erasable Programmable Read Only Memory (EPROM) on the 8748 microcomputer chip. (Author)

AD-A083 841/7 PC **A02/MF A01**
Naval Postgraduate School Monterey CA
The Text Editor as a Uniform Man/Machine Interface. A Proposal for a Standard Editor.
Technical rept.,
Lyle Ashton Cox, Jr. Feb 80, 24p Rept no. NPS52-80-001

There is a substantial group of professionals, scientists, engineers, and managers who are justifiably reluctant to use computer networks such as the ARPANET. This phenomenon continues despite the fact that they recognize some of the benefits of computational assistance, that they have had experience using computer systems, and that they have access to such a network. Their reluctance usually stems from the feeling that the very machines and systems is not justified by the occasional or intermittent nature of their computational problems. In learning to use a new system, a large part of the familiarization effort is spent in trying to learn to use a new text editing program. If such a utility program were standardized and made available on all of the machines on the network, a large obstacle to the efficient use of such systems might be removed. The design of such a system, a Standard Line EDitor called SLED is proposed here. (Author)

AD-A083 842/5 PC **A02/MF A01**
Naval Postgraduate School Monterey CA
Performance Prediction from a Computer Hardware Description.
Technical rept.,
Lyle Ashton Cox, Jr. Dec 79, 25p Rept no. NPS52-79-001

Today's computers are among the most complex man made systems in existence today. How can we make our designs not only more precise, but make these systems more accurately and cost effectively achieve their goals. We have begun to rely upon computer aided design techniques. The use of these techniques often commences not with the statement of the system goals, but rather with the specification of an architecture and a logic technology. In view of the high costs of computer development, we should be quite confident that our architecture/technology combination is capable of meeting the system requirements before we proceed to more detailed design phases. The entire system design process must be integrated, and include performance prediction and verification techniques. This design process should be reflected in a single description language. A methodology for accomplishing this goal capable of employing many existing design practices is discussed here. (Author)

AD-A083 937/3 PC **A05/MF A01**
Science Applications Inc Englewood CO
Studies in Plan Construction I: Analysis of an Extended Protocol.
Techanical rept.,
Michael R. Atwood, and Robin Jeffries. Mar 80, 84p Rept nos. SAI-80-028-DEN, TR-2
Contract N00014-78-C-0165

This report describes the analyses of long, thinking-aloud protocols collected from two experienced software designers during their initial attempts at solving a moderately difficult design problem. Our method of analysis involves transforming the protocols into a series of rules in a condition-action format. These rules reflect the 'policies', or general strategies that guide design activities, 'goals', that indicate the actions that a designer intends to accomplish, and 'notes', that represent problem-specific information that was generated or retrieved during the course of problem solving. Solving a design problem involves the identification of the components that must be included in a design and the solutions of these components. The identified components represent the subproblems that must be solved in order to complete the design, and these solutions involve the creation and satisfaction of goals. In this report, we focus on the form and content of these goal structures and the manner in which they are generated. We conclude that the design components tend to be enumerated breadth-first on certain classes of design problems, and that the associated goals are explored depth-first. This cycle proceeds through multiple iterations and other processes constrain the expansions of these top-down processes. (Author)

AD-A083 988/6 PC **A02/MF A01**
Rensselaer Polytechnic Inst Troy NY Dept of Electrical and Systems Engineering
Adaptive Image Estimation Using Reduced Update Filters,
J. W. Woods, and H. Kaufman. Mar 80, 7p
AFOSR-TR-80-0298
Grant AFOSR-77-3361

When an image is estimated from noisy data using a linear shift-invariant (LSI) filter, the subjective improvement is relatively poor at low signal-to-noise ratios. This occurs for at least two reasons: first, the statistics of the image are markedly space-variant and second, the eye is very sensitive to blurring of edges. However, adaptive filtering techniques can be applied to improve the subjective quality of noisy images even at low signal-to-noise ratios.

This is accomplished in the present work by using multiple models to match the space-invariant statistics and by using oriented edge models to prevent edge blurring in the filtered result. (Author)

AD-A083 991/0 PC **A06**/MF **A01**
Air Force Avionics Lab Wright-Patterson AFB OH
Log Polar Quantization.
Interim technical rept. 1 Apr 77-1 Sep 78,
Robert T. Coker, and Guy D. Couturier. Oct 79, 124p Rept no. AFAL-TR-79-1075

Log Polar Quantization was developed as an alternative to real-imaginary quantization for complex digital signal processing. The motivation was to achieve a better match between the quantization scheme and complex signal processing characteristics, without precluding the effective use of microprocessor or bit slice processor architectures. The subject report provides information on a specific Log Polar Vector Adder which was breadboarded and simulated, to provide an example of the implementation of such a quantization scheme. (Author)

AD-A084 018/1 PC **A02**/MF **A01**
Army Satellite Communications Agency Fort Monmouth NJ
Project ARIES. SDL – A String Description Language.
Final rept. May 79-May 80,
Richard L. Conn. 18 Apr 80, 11p

SDL (String Description Language) is a recursive language which is used to define the structures of strings of ASCII characters. It permits implicit and explicit definition of strings, and it can be generally used to describe almost any language or set of strings. Derived from BNF and Extended BNF, it contains many features from these languages as well as several extensions made by the author. SDL may be used to describe context free languages. (Author)

AD-A084 022/3 PC **A09**/MF **A01**
Naval Surface Weapons Center Dahlgren VA
Program Design Language Architecture Specification for the AN/UYK-7 Central Processor.
Final rept.,
Alan J. Hynson, Jay C. Meyers, and Charles J. Naples. Feb 80, 200p Rept no. NSWC/TR-80-18

The Univac AN/UYK-7 computer is the Navy's standard mainframe computer for medium and large scale applications. This report presents a Program Design Language (PDL) description of the AN/UYK-7 Central Processor (CP) architecture and is intended for use as a reference document. This PDL was used as a design specification for a microprogrammed emulation of the AN/UYK-7 Central Processor. This emulation has been validated through the successful execution of the AN/UYK-7 Central Processor (CP) diagnostics and by an independent testing effort.

AD-A084 026/4 PC **A07**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD
Computation, Mathematics and Logistics Department Report for Fiscal Year 1978.
Progress rept.
Mar 80, 139p Rept no. DTNSRDC-80/034

This report summarizes the progress made during FY78 by the staff of the Computation, Mathematics and Logistics Department in programs generally designed to develop and exploit mathematical and computational technology for the Navy. Significant accomplishments were realized in numerical fluid mechanics, computer aided ship design, logistics analysis, and logistic information systems. Our participation in Navy-wide efforts concerned with sharing of both computers and data continued and expanded. These and other Department projects are discussed in this report. (Author)

AD-A084 047/0 PC **A04**/MF **A01**
Rensselaer Polytechnic Inst Troy NY Dept of Electrical and Systems Engineering
Texture Discrimination Based upon an Assumed Stochastic Texture Model.
Final technical rept. 31 Oct 78-30 Oct 79,
James W. Modestino, Robert W. Fries, and Acie L. Vickers. Mar 80, 64p RADC-TR-80-58
Contract F30602-78-C-0083

A new approach to texture discrimination is described. This approach is based upon an assumed stochastic model for texture in imagery and is an approximation to the statistically optimum maximum likelihood classifier. The construction and properties of the stochastic texture model are described and a digital filtering implementation of the resulting maximum likelihood texture discriminant is provided. The efficacy of this approach is demonstrated through experimental results obtained with simulated texture data. A comparison is provided with more conventional texture discriminants under identical conditions. The implications to texture discrimination in real-world imagery are discussed. (Author)

AD-A084 068/6 PC **A11**/MF **A01**
Royal Signals and Radar Establishment Malvern (England)
The Coral 66 Compiler for Ferranti ARGUS 500 Computer.
Technical note,
B. Gorman. Jun 78, 241p RSRE-TN-799, DRIC-BR-67199

This documentation is a working description of the Coral 66 compiler for the ARGUS 500 produced by RRE under contract from Ferranti Ltd. It serves not only as a guide to the actual operation of the compiler, but also as an example of the use of RRE compiler building tools and techniques. These represent the culmination of many man years of research, as also do some of the important Algorithms used within the compiler. The use of the compiler to compile itself makes it to a large extent self checking. Its very modular nature enables testing to be simplified as many modules are non interacting. The central routine, about which the whole compiler is built, uses a transformed syntax which has been exhaustively checked by syntax manipulation programs. These features should enable a high degree of confidence to be placed in the correct operation of the Compiler. Part 1 of this document contains the detailed description of the individual modules forming the Compiler. This is preceded by notes on particular aspects of the techniques and standards used, and by an overall description of the compiler strategy, quoting the syntax rules in which it is embedded. Part 2 consists of printouts of the actual program of the compiler and of the final syntax used. Each of these is accompanied by a list of all the identifiers used, giving the names of the pages on which they occur, the number of occurrences on each page, and the total number of occurrences.

ANL-AMD-TM-341 PC **A02**/MF **A01**
Argonne National Lab., IL.
Toolpack Prospectus.
W. R. Cowell, and W. C. Miller. Sep 79, 16p
Contract W-31-109-ENG-38

A group of computer scientists from universities, government laboratories, and private industry explored the idea of producing a systematized collection of software tools to facilitate the development and maintenance of Fortran programs. The collection would be a mechanism for making existing capabilities, resulting from research in software engineering, more readily available to Fortran users, in particular those developing numerical software. The construction of a unified ensemble of software tools from the specialized work of several groups would, itself, present significant challenges in software engineering. The planning group concluded that an organized effort to build a collection (to be called Toolpack) is feasible. They have taken the initial technical and organizational steps toward creating Toolpack. This prospectus is intended as a summary of the background, goals, and implementation strategy of the proposed project. (ERA citation 05:017282)

ANL-AMD-TM-346 PC **A03**/MF **A01**
Argonne National Lab., IL.
Comparative Study of the Fortran Development Environment Provided by the VAX/VMS and VAX/UNIX Operating Systems.
R. C. Raffenetti. Nov 79, 33p
Contract W-31-109-ENG-38

Two operating systems available to control the Digital Equipment Corporation (DEC) VAX-11/780 computer were compared. The two operating systems were the VAX/VMS system from DEC and the UNIX system from AT and T. The purpose of the comparison was to select an operating system. The objectives of the study focus on the Fortran environment of each system. The following features are discussed: learning the systems (off-line documentation, on-line documentation, tutorials, mail), basic system elements (the file systems, the command languages), text manipulation (text management, editing, listings, text processing), Fortran language support (the Fortran compilers, the linking loaders, user libraries, Fortran preprocessors), program execution (run-time error messages, input and output, symbolic debugging systems), and execution speed statistics. 4 tables. (ERA citation 05:017283)

CONF-790212-(Sum.) PC **A04**/MF **A01**
Department of Energy, Washington, DC. Office of Computer Services and Telecommunications Management.
Operations Managers Conference: Summary of Proceedings.
Feb 80, 67p
Association for energy systems, operations, and programming (AESOP) operations managers meeting, Carmel, CA, USA, 13 Feb 1979.

The fifth AESOP Operations Managers Conference was held in Carmel, California on February 13-15, 1979. The keynote address dealt with the changing role of the computer operations manager. Representatives presented contrasting approaches to managing the procurement and installation of new computer systems. The advantages and disadvantages of maintaining strong internal management support and good communication with the vendor and of increasing the involvement of broad-based planning committees and operations personnel in the computer procurement process were discussed. Two promising management programs, the PEER and 10/40 systems proved effective in improving employee morale by reducing job fragmentation, increasing internal mobility and modifying the work week. The topic of unionization of operations personnel was also discussed. The uneasy relationship between computers and the energy shortage was also considered. Techniques for avoiding computer problems caused by blackouts and brownouts were presented. The difficulty of conserving power at a computer facility was also discussed. Presentations concerning the President's committee on ADP reorganizaion and methods for predicting trends in computer innovation were made. Abstracts and two-page summaries of the papers given are included in this report. (ERA citation 05:018284)

COO-2310-6 PC **A11**/MF **A01**
Princeton Univ., NJ. Dept. of Statistics.
Research on Data Analysis in the Physical Sciences. Final Progress Report, March 1973-November 1979.
J. W. Tukey, and P. Bloomfield. Nov 79, 229p
Contract EY-76-S-02-2310

In its most general terms, the work carried out under the contract consists of the development of new data analytic methods and the improvement of existing methods, their implementation on computer, especially minicomputers, and the development of non-statistical, systems-level software to support these activities. The work reported or completed is reviewed. (ERA citation 05:017284)

GA-A-15143 PC **A05**/MF **A01**
General Atomic Co., San Diego, CA.
Algorithm to Integrate Systems of Nonlinear Ordinary Differential Equations, with Application to the Advanced Fiper Code.
P. D. Smith. 1 Feb 80, 87p
Contract AT03-76ET35300

A general purpose algorithm for integrating nonlinear systems of ordinary differential equations is presented. A number of specific applications are discussed, such as mixed linear/nonlinear problems, mixed transient/steady-state problems, and substructuring. The problem of integrating past singularities is briefly discussed. It is concluded that while the algorithm is easily derived in an elementary form, its efficient use in some of the more complicated problems requires a number of special considerations in the derivation and in the pro-

gramming. Each specific application can probably benefit from custom treatment. Nevertheless, each application ultimately distills to the following essence: (1) The incremental predictor and corrector phases employ substantially the same steps. (2) The predictor phase is a modified implicit extrapolation of the current rates. (3) The corrector phase is a modified Newton's method based on the residual of a vector function. (4) In partially linear problems one can save steps by matrix partitioning. (5) The frequency of updates of the tangent matrix is arbitrary, and the calculational efficiency can be optimized by simultaneously varying the size of the time step and the frequency of the matrix updates. (ERA citation 05:017288)

N78-74659/1 PC **A18**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
The MSFC/UAH Data Management Symposium Held at Huntsville, Alabama on October 18 and 19, 1977.
1977, 424p NASA-CP-2040
Prepared in cooperation with Alabama Univ., Huntsville.

This document contains the proceedings of a symposium on the management and utilization of space-acquired remotely-sensed and ancillary data for the 1980's. The symposium consisted of two sessions; the first concerned simulation and processing techniques, while the second concerned data base management systems.

N80-22659/0 PC **A06**/MF **A01**
Aeronautical Research Labs., Melbourne (Australia).
Airborne Data Processor.
K. F. Fraser, and U. R. Krieser. Nov 78, 121p
ARL/MECH-ENG-153, AR-001-317

Airborne equipment developed for use in the acquisition and recording of both analog and digital data is described. These data are recorded using a single analog magnetic tape transport. A reference frequency, for use in servo-speed control of the ground station tape reproducing machine, is combined with speech using a balanced modulator. Recording of these data is performed using direct techniques. Up to eight channels of analog data, which may require measurement over large bandwidth (up to 20 kilohertz), are time multiplexed at rates which are variable over a wide range. Recording of the multiplexed data is performed using frequency modulation techniques. A highly stable crystal oscillator generates an input clock for a time code generator which provides time-of-day in digital form. Up to 32 channels of analog data, requiring measurement at relatively low bandwidth but at high accuracy, are time multiplexed and converted to digital form using commercially available airborne equipment. The digital output from the above equipment together with that from the time code generator and from up to two digital transducers are multiplexed digitally. The digital data are serialized and converted to a form suitable for recording using the analog tape machine.

N80-22670/7 PC **A11**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (Germany, F.R.). Inst. fuer Nachrichtentechnik.
Contribution Towards Automatic Investigation and Perception of Texture in Digitized Remotely Sensed Images.
Ph.D. Thesis - Technische Univ.
R. Fiedler. Feb 79, 246p DFVLR-FB-79-08
Text in German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-621).

The problems that arise from the automated analysis of texture in images are reviewed. Mathematical algorithms are presented for the determination of texture and borders as well as texture classification. The description makes use of the frequency dependence of the image structure that characterizes texture. The interactive digital image processing system, DIBIAS, which provided the images for the analysis is described.

N80-22671/5 PC **A08**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (Germany, F.R.). Inst. fuer Nachrichtentechnik.
Enhancement of Multispectral Scanner Images by Digital Filtering.
Ph.D. Thesis - Technische Univ.
P. Nowak. Jan 79, 159p DFVLR-FB-79-11
Text in German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-624).

The possibilities of image restoration and image enhancement by means of two dimensional digital filtering were studied. The sensor system, possible distortions of the image signal, and the theory of nonrecursive digital filtering are discussed. Two design methods for digital filters are presented. The application of digital filtering to multispectral scanner imagery is described.

N80-22759/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Program for Integrating Multizonal Photographs of the Earth, Taken by Mkf-6 Camera, in a Computer.
A. V. Agapov, and S. T. Mosin. Jan 80, 14p
NASA-TM-75701, PR-323
Contract NASW-3199
Transl. Into English of "Programma Sovmeshcheniya V Evm Mnogozonainykh Fotosnimkov Zemli, Poluchennykh Fotokamerami Mkf-6", Rept. Pr-323 Acad. Of Sci. USSR, Inst. Of Space Res., Moscow, 1977 p 1-13. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Acad. Of Sci. Ussr, Kolosov.

An algorithm and program are described, for integrating up to 6 simultaneously exposed photographs in different spectral ranges of the surface of the Earth, taken by MKF-6 cameras aboard Soyuz-22. Three of the reference marks are identified on 1 photograph and then are used to integrate the other photographs with the first. The program was compiled for the ES-1040 computer, as a standard subprogram in a system for computer processing of data of study of the Earth from space.

N80-23023/8 PC **A05**/MF **A01**
European Space Agency, Paris (France).
The Use of Digital Integrators, Particularly Digital Differential Analyzers, in Process Control Computers.
R. Freilung. Jul 79, 79p ESA-TT-533, DLR-FB-77-71
Transl. Into English of "Einsatz von Digitalen Integrierern in Prozessrechnern Unter Besonderer Beruecksichtigung von Inkrementerechenschaltungen (Dda)", Rept. Dir-FB-77-71 Dfvlr, Brunswick, Jan. 1978. Original Report in German Previously Announced as X79-72229.

The principle of digital integrators is explained using a practical example, and the fundamentals of digital differential analyzers are treated. Several simple integration algorithms which take only a few program steps in digital computation and which are useful for digital differential analysers are reviewed. The error due to the integration algorithm chosen is shown in some applications to feedback systems. Some realizations of digital integrators for the simulation of dynamic systems are given for use in a programmable digital computer, as well as for use in hardware computing elements.

N80-23041/0 PC **A11**/MF **A01**
Research Inst. of National Defence, Stockholm (Sweden).
Design Specification for Datalab: A System for Data Analysis Based on Relational Model of Data.
S. Arnborg, E. Elvers, and P. Svensson. Nov 79, 232p FOA-C-20326-D8

The design documentation for a proposed interactive program system, Datalab, intended for data analysis applications in science, technology, and management is presented. The kernel of the system is a relational database subsystem permitting the evaluation of queries expressed in a relational algebra query language. Onto this kernel are added several subsystems which serve to enhance the analytic power of the system, to simplify its use, and to ensure the security of its database. The system is functionally extensible, in the sense that additions to the standard set of application programs can be made by a programmer user.

N80-23048/5 PC **A03**/MF **A01**
Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
Digital Compensators for Sampled Data Systems and Minimum Time Command.
A. Bernard. 1979, 27p ONERA-NT-1979-3
Text in French; English Summary. Report Will Be Also Announced as Translation (Esa-TT-607).

The minimum time command for a sampled system is that which allows a given change of state within a minimum number of sampling periods. The calculation of successive commands from the transition equations is presented and a method for determining and initializing numerical correctors is proposed.

PATENT-4 197 507 Not available NTIS
Department of the Navy Washington DC
Suppressing Pulse Synthesizer.
Patent,
Robert E. Cunningham, and Philip H. Bush. Filed 7 Apr 78, patented 8 Apr 80, 8p AD-D007 185/2, PAT-APPL-894 462
Supersedes PAT-APPL-894 462-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A suppressing pulse synthesizer for supplying the proper average number of synchronization pulses from a reproduced reference signal to an analog to digital converter utilized to convert analog data present on a magnetic tape to digital data. (Author)

PB80-177546 PC **A03**/MF **A01**
Environmental Monitoring Systems Lab., Las Vegas, NV.
Command Procedures for Manipulating Tape Data Files: A Set of Procedures Developed for Use With the COMNET ALPHA Time-Sharing System.
Final rept. Jun 78-Mar 79,
R. A. McCrory, and L. R. Williams. Mar 80, 32p
EPA-600/8-80-013

The problem addressed by this report is the lack of simple terminal commands to manipulate tape data files at the U.S. Environmental Protection Agency's Washington Computer Center. This work was performed to enable relatively inexperienced programmers or scientists to maintain large infrequently used data sets on magnetic tape. The report documents a set of terminal command language procedures which greatly simplify the maintenance of data files on magnetic tape. The command procedures are invoked by entering a single work at the computer terminal. The computer queries are the user for specific information and then submits a job to accomplish the actual data transfer. Ancillary procedures are included to facilitate the housekeeping requirements of tape management. The storage of large infrequently-used data sets on magnetic tape saves ADP funds and frees system resources for other applications. Such savings lessen capital investment requirements as the Agency's ADP needs expand. Disk storage charges have been cut by 50% by the use of these procedures.

PB80-184377 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. Inst. for Computer Sciences and Technology.
Sizing Distributed Systems: Overview and Recommendations.
Final rept.,
Sandra A. Mamrak. May 80, 25p NBS-SP-500-60
Library of Congress catalog card no. 80-600061.

Computer system sizing is a complicated process for which a variety of tools have been developed. The choice of tools for a particular sizing exercise is guided by many considerations such as cost, available data and the expertise of the analyst. This report presents an overview of sizing techniques, a brief discussion of the factors that affect choosing one or a combination of techniques, and a set of recommendations for choosing tools for sizing distributed systems. The report is aimed at managerial-level personnel who have developed technical competence with regard to single-processor computer systems and are faced with procurement decisions regarding distributed computer systems or services.

SAND-80-0562C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Divide and Conquer: A Computer Networking Premise.
J. L. Mortley. 1980, 10p CONF-800502-6
Contract EY-76-C-0789
26. international instrumentation symposium, Seattle, WA, USA, 5 May 1980.

In alternate energy source R and D there are few guidelines to assist the measurement and control engineer in his conceptual or final design; in fact, frequently the final design for one part of an advanced experimental facility is in progress or complete before the conceptual design can be started for the next phase. This paper discusses the philosophy, technique, pros, and cons of utilizing mini- and microcomputer-distributed networks to distribute tasks without stifling growth or creativity and still meeting cost and performance estimates. Also, examples of actual design solution and evolution of an alternate energy source research facility are discussed. 5 figures, 1 table. (ERA citation 05:015934)

UCRL-83349 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
2-D Digital Signal Processing with an Array Processor.
R. E. Twogood. Jan 80, 5p CONF-800404-1
Contract W-7405-ENG-48
IEEE international conference on acoustics, speech, and signal processing, Denver, CO, USA, Apr 1980.

The applicability of array processor (AP) technology to 2-D digital signal processing is investigated in this paper. The AP-based image processing facility at LLL is described, with emphasis on our applications software package which utilizes the array processor. Implementations of several key image processing algorithms are discussed and compared with other conventional processors, indicating that array processors are extremely cost-effective for image processing applications. (ERA citation 05:017304)

9C. Electrical and Electronic Engineering

N80-22378/7 PC **A10**/MF **A01**
LinCom Corp., Pasadena, CA.
SPS Phase Control System Performance Via Analytical Simulation.
W. C. Lindsey, A. V. Kantak, C. M. Chie, and R. W. D. Booth. Mar 79, 222p NASA-CR-160582, TR-7903-0977
Contract NAS9-15725

A solar power satellite transmission system which incorporates automatic beam forming, steering, and phase control is discussed. The phase control concept centers around the notation of an active retrodirective phased array as a means of pointing the beam to the appropriate spot on Earth. The transmitting antenna (spacetenna) directs the high power beam so that it focuses on the ground-based receiving antenna (rectenna). A combination of analysis and computerized simulation was conducted to determine the far field performance of the reference distribution system, and the beam forming and microwave power generating systems.

N80-22596/4 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Steady-State Analysis of a Faulted Three-Phase Four-Wire System Supplying Induction Motors with Neutrals Connected and Other Single-Phase Line-to-Neutral Loads.
M. E. Wood. Mar 80, 67p NASA-TM-80795, JSC-16517

Four wire Wye connected ac power systems exhibit peculiar steady state fault characteristics when the fourth wire of three phase induction motors is connected. The loss of one phase of power source due to a series or shunt fault results in currents higher than anticipated on the remaining two phases. A theoretical approach to compute the fault currents and voltages is developed. A FORTRAN program is included in the appendix.

PB80-810781 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Lightning, Surge and Transient Protection. 1978-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1978-Apr 80,
William E. Reed. Jun 80, 113p
Supersedes NTIS/PS-79/0154 and NTIS/PS-78/0187. See also 1964-1977, NTIS/PS-79/0153.

Techniques and devices for the protection of electronic and electrical equipment are presented in these Federally-sponsored research reports. The citations include research on suppressors, limiters, lightning arresters, electromagnetic pulse protection devices, and overvoltage protection networks. Electromagnetic shielding is excluded. (This updated bibliography contains 44 abstracts, 106 of which are new entries to the previous edition.)

PB80-810849 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Electromagnetic Shielding. 1972-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1972-May 80,
William E. Reed. Jun 80, 308p
Supersedes NTIS/PS-79/0526 and NTIS/PS-78/0524. See also 1964-1971, NTIS/PS-75/366.

The bibliography presents research on electromagnetic shielding of electronic and electrical equipment, personnel, and ordnance. The shielding effectiveness of materials and structures is covered. Nuclear electromagnetic pulse shielding is included. (This updated bibliography contains 301 abstracts, 19 of which are new entries to the previous edition.)

9D. Information Theory

AD-A083 645/2 PC **A04**/MF **A01**
Systems Control Inc (VT) Palo Alto CA
Identification of Dynamical Systems in the Presence of Non-Gaussian and Non-Whie Noise.
Rept. for Nov 78-Nov 79,
H. Salzwedel, N. K. Gupta, and W. E. Hall. Dec 79, 63p Rept no. SCI-TR-5274-04
Contract N00014-78-C-0519

Analysis of test results indicates that the measurement and process noise is significantly non-white and non-Gaussian. Some analyses indicate that 10% to 15% of the data points may deviate significantly from non-Gaussian distribution. In addition, numerous sources lead to non-white noise. These errors effect both the accuracy of state and parameter estimates as well as the estimation of accuracy levels. In this report, techniques have been developed to treat systems with non-white and non-Gaussian noise. These techniques provide good estimates under given whiteness and Gaussianess conditions. The procedures are simple and can be easily incorporated in the standard maximum likelihood and model structure determination methods.

PB80-184468 PC **A09**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
Adaptive Frequency Estimation and New Convergence Properties for the Least Mean Square Algorithm.
Technical memo.,
Robert Jeffrey Keeler. Feb 80, 195p NOAA-TM-ERL-WPL-49, NOAA-80041602

The convergence properties of the least mean square algorithm are interpreted in terms of a vector space associated with the coefficients of the adaptive linear prediction filter (ALPF). Signal planes defined in this weight vector space are used to describe the frequency tracking by characteristics of spectral estimators based on the ALPF and are used to explain the effects of both the filter parameters and the algorithm on tracking speed. The performances of three different adaptive frequency estimators derived from the ALPF are compared. Two of these employ Fourier transforms of the coefficients and the third is based on a transform of the ALPF output. Comparisons with the conventional periodogram spectrum estimator are presented in terms of a signal-to-noise ratio (SNR) defined in frequency domain parameters. Specific calculations for one ALPF frequency estimator (The maximum entropy estimator) are used to demonstrate a bias in this estimator.

9E. Subsystems

AD-A083 687/4 PC **A03**/MF **A01**
Ohio State Univ Columbus Electroscience Lab
On Grating Nulls in Adaptive Arrays.
Technical rept.,
A. Ishide, and R. T. Compton, Jr. Mar 80, 38p Rept no. ESL-711847-6
Contract N00019-79-C-0281

This report considers the effect of element patterns on grating nulls in adaptive arrays. Two simple array models, a two-element and a three-element array with dipole element patterns, are used to study this question. The element patterns are assumed unequal (i.e., the beam maxima point in different directions). It is shown that element patterns greatly affect the occurrence of grating nulls in the array. Unequal element patterns cause extra grating nulls ('sign reversal grating nulls') to occur, in addition to conventional grating nulls. These sign reversal grating nulls can occur even with element spacing less than a half-wavelength. For a two-element array with dipole element patterns, it turns out that grating nulls cannot be avoided if the spacing is greater than a half wavelength. However, with more than two elements, the situation is not so bleak. An example is given of a three-element array with dipole patterns and one wavelength spacing in which all grating nulls are eliminated. (Author)

AD-A083 699/9 PC **A05**/MF **A01**
Royal Aircraft Establishment Farnborough (England)
A Thick Film Microstrip Butler Matrix for the Frequency Range 1.5-1.7 GHz.
Technical rept.,
A. G. Tabb. Sep 79, 96p RAE-TR-79118, DRIC-BR-72772

This Report describes the design, construction and electrical measurement of a 4 x 4 Butler Matrix for the 1.5-1.7 GHz frequency range. The Matrix was constructed in thick film technology on an alumina substrate. A computer aided design package was used for the circuit synthesis. A Butler Matrix is a passive multiport component which when loaded with radiating elements enables production of a beam of microwave energy in a specified direction in space, dependent upon which input port is activated. The Butler Matrix consists of an equal number of input and output ports connected through an array of phase shifters and couplers such that when a signal is applied to any input port it produces equal amplitude signals at all output ports.

AD-A083 791/4 PC **A03**/MF **A01**
Army Electronics Research and Development Command Fort Monmouth NJ Electronics Technology/Devices Lab
Effect of Various Dielectrics on the Design of Millimeter-Wave Line Scanning Antennas.
Research and development technical rept.,
Kenneth L. Klohn. Nov 79, 26p Rept no. DELET-TR-79-24

The effect of using various materials having different relative dielectric constants on the theoretical design of millimeter-wave line scanning antennas has been examined. Three typical dielectrics were chosen for comparative purposes; silicon (epsilon(r) = 12, sapphire (epsilon(r) = 9.4), and boron nitride (Epsilon(r) = 4). Theoretical calculations were made for each material over the frequency range of 60 to 220 GHz, with special emphasis at 94 GHz due to its increasing use in new millimeter-wave systems. Comparisons were made among the dielectric materials in regard to their maximum allowable physical size for single E(y) 11 mode operation. Using each of the three dielectrics with periodic surface perturbations as a line scanning antenna, the effects on the angle of radiating energy due to changes in the waveguide size and perturbation spacing were determined and evaluated.

AD-A083 854/0 PC **A06**/MF **A01**
Naval Postgraduate School Monterey CA

A 16 - Level Color Display System for Two Dimensional Ultrasonic Data.
Master's thesis,
Eugene L. Moon. Dec 79, 101p

a 16 - level color display computer program for use with an ultrasonic acoustic imaging system is presented. This display system is the second half of a two part ultrasonic imaging system built at the Naval Postgraduate School. The RAMTEK GX-100A display terminal and a PDP 11/50 digital computer were used as the display system. The software implementation and C language are discussed. Photographs of actual display using an experimental data tape and the computer program are also included. (Author)

AD-A083 867/2 PC **A02**/MF **A01**
Rome Air Development Center Hanscom AFB MA Deputy for Electronic Technology
Analysis of the Microstrip Disk Antenna Element,
Anders G. Derneryd. 26 Oct 77, 8p Rept no. RADC/ETR-80-0012
Pub. in IEEE Transactions on Antennas and Propagation, vAP-27 n5 p660-664 Sep 79.

No abstract available.

AD-A083 869/8 PC **A02**/MF **A01**
Rome Air Development Center Hanscom AFB MA Deputy for Electronic Technology
SAW Butterworth Contiguous Filters at UHF,
Andrew J. Slobodnik, Jr., George A. Roberts, T. Edward Fenstermacher, Jose H. Silva, and William J. Kearns. 14 Aug 78, 10p Rept no. RADC/ETR-80-0011
Pub. in IEEE Transactions on Sonics and Ultrasonics, vSU-26 n3 p246-253 May 79.

No abstract available.

AD-A083 875/5 PC **A02**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Six Channel Digital Delay Generator.
Final rept.,
Clifford L. Aseltine. Jan 80, 18p ARBRL-TR-02213, AD-E430 408

A six channel digital delay generator is described which can provide delays of .5 microsec to 10,000 microsec. Delays are digitally generated and are designed to operate in high RFI areas such as those encountered in ballistic measurements.

AD-A083 920/9 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Interactive Effects of Bond Wires Used for Microwave Semiconductor Device Combining and Matching Circuitry.
Interim rept.,
R. E. Neidert, H. A. Willing, and B. E. Spielman. 5 Mar 80, 11p Rept no. NRL-8388

For arrays of bond wires, inter-wire coupling can significantly affect the parameters of the individual wires. Design information is given for two port problems consisting of multiple bond wire arrays over a ground plane. Secondly, bond wire coupling can degrade the combining efficiency of several wire-combined solid state devices (such as transistor unit cells). This problem is modeled and analyzed, and remedies are suggested. (Author)

AD-A083 921/7 PC **A02**/MF **A01**
Army Engineer Topographic Labs Fort Belvoir VA
The ETL Hybrid Optical/Digital Image Processor,
John R. Benton, Francis Corbett, and Richard Tuft. 1 Feb 80, 13p Rept no. ETL-R007

An optical-digital processor for generalized image enhancement and filtering has been designed and is now under construction. The optical subsystem is a two PROM Fourier filter processor. Input imagery is isolated, scaled, and imaged onto the first PROM. This input plane acts like a liquid gate and serves as an incoherent to coherent converter. The image is transformed onto a second PROM which also serves as a filter medium. Filters are written onto the second PROM with a laser scanner in real time. A solid state CCTV camera records the filtered image which is then digitized and stored in a digital image processor. The operator can then manipulate the filtered image using the gray scale and color remapping capabilities of the video processor as well as the digital processing capabilities of the mini-computer. The operator can then try new optical filters and iteratively develop optimum methods of detecting patterns. The goal of this research is to develop automated feature extraction algorithms which will minimize the need for human intervention.

AD-A083 992/8 PC **A04**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
PIN Diode Weight Circuits.
Technical note,
Bing M. Potts. 28 Dec 79, 75p TN-1979-26, ESD-TR-79-306
Contract F19628-80-C-0002

This report is one of a number of technical notes describing various aspects of the design, fabrication, and performance of a demonstration analog feedback processor. In this report we examine the PIN diode weight circuits which are used in the adaptive processor to control the attenuation and phase of the eight signal channels which make up the processor. The weighting circuits are required to have well-matched transfer functions which track closely from channel to channel so as not to degrade the processor cancellation. To achieve the necessary tracking performance, two different weight circuit designs were investigated. The tracking performance of the first set was found to be limited by the direct feed-through of input signals to the output of the weight circuit as a result of the limited dynamic range of the weight circuit attenuator. To overcome this limitation, a second set of weight circuits having significantly improved tracking characteristics was fabricated using an improved attenuator circuit design. Information relevant to the design, fabrication and testing of each weight circuit is presented along with measured data to demonstrate its performance. Techniques used in characterizing the frequency tracking performance of multiple weight circuits are discussed and measurement data is presented to illustrate the relative tracking performance of the weight circuits. (Author)

AD-A084 004/1 PC **A06**/MF **A01**
Gould Inc Glen Burnie MD Chesapeake Instrument Div
Deploy/Retrieve Storage System (DRSS). Volume I. System Level Definition and Tradeoff Analysis.
Final rept.
31 Jan 80, 113p
Contract N00039-79-C-0329
See also Volume 2, AD-A084 005. Errata sheets inserted.

This purpose of this study was to develop system concept(s) for a Deploy/Retrieve/Storage System (DRSS) for present and future Radio Frequency Buoyant Cable Antenna Systems on SSN and SSBN submarines, and provide the basis for investigation of performance, installation and cost tradeoffs. The DRSS shall functionally replace the antenna transfer mechanism, antenna storage reel, pressure hull interface, conduit and tow/exit point presently installed on submarines as part of the existing AN/BRA-18 and AN/BRA-24, systems. The present system has the following major problem areas: exerts excessive compressive, bending, torsional and tensile forces on in-line electronic, connectors and antenna assemblies developed for present and future antennas; restricts the development of future antennas and associated components; requires extensive effort for maintainability; requires a bend radius of 6 in. on in-line electronics and associated components; introduces excessive structureborne noise; requires excessive manpower/effort to deploy/retrieve/store antenna assemblies; and does not accurately determine amount of cable deployed. The basic guidelines for the study were to establish an analysis of conceptual means to deploy, retrieve and store buoyant cable antenna systems. Twenty specific requirements were placed upon the conceptual system. Additionally, five goals were to be achieved.

AD-A084 051/2 PC **A03**/MF **A01**
Army Electronics Research and Development Command Fort Monmouth NJ Electronics Technology/Devices Lab
Design of Silicon Dielectric Waveguide Line Scanning Antennas for Millimeter Waves.
Research and development technical rept.,
Kenneth L. Klohn, Robert E. Horn, Harold Jacobs, and Elmer Freibergs. Aug 78, 38p Rept no. DELET-TR-78-19

The design and experimental findings of a novel approach for a relatively simple, low cost, frequency scanning millimeter wave antenna are described. The antenna consists of a silicon dielectric rectangular rod with periodic metallic stripe perturbations on one side. The feasibility of electronically scanning through a range of angles by varying the frequency fed into the silicon rod is shown. Calculations were made to determine the allowable physical size of the silicon rod in order to maintain a single fundamental mode of operation and the effect which size variations and perturbation spacing have on the angle of radiation and the range of angular scan for a given frequency shift. Efforts covered the frequency range 55 GHz to 100 GHz with specific points of interest at 60, 70 and 94 GHz. The results of experiments conducted are compared with the theoretical calculations. (Author)

JINR-R-13-10094 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Analog-to-Digital Converter for Slow Signals.
V. M. Gorshkov, and B. A. Morozov. 1976, 8p In Russian.
U.S. Sales Only.

Designed is an 8-input analog-digital converter which provides for input of the data from the transducers into the computer, thereby improving accuracy of the target parameter monitoring at the p-p scattering. The converter is made on the basis of a functional generator with linear modulation of the output frequency. The functional diagram of the converter is described and its brief characteristics are considered. The converter employs basically the microcircuits and incorporates only one "voltage-frequency" converter for eight inputs. The analog-digital converter features low integral nonlinearity of about 0.7% and high temperature stability of the conversion characteristic of about 0.03%. (Atomindex citation 10:433942)

N80-22544/4 PC **A05**/MF **A01**
Lockheed Missiles and Space Co., Sunnyvale, CA.
Study of Wrap-Rib Antenna Design.
Final Report.
W. D. Wade, A. Sinha, and R. Singh. 12 Dec 79, 85p NASA-CR-162929, LMSC-D714613
Contracts NAS7-100, JPL-955345

The results of a parametric design study conducted to develop the significant characteristics and technology limitations of space deployable antenna systems with aperture sizes ranging from 50 up to 300 m and F/D ratios between 0.5 and 3.0 are presented. Wrap/rib type reflectors of both the prime and offset fed geometry and associated feed support structures were considered. The significant constraints investigated as limitations on achievable aperture were inherent manufacturability, orbit dynamic and thermal stability, antenna weight, and antenna stowed volume. A data base, resulting in the defined maximum achievable aperture size as a function of diameter, frequency and estimated cost, was formed.

N80-22577/4 PC **A06**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen (Germany, F.R.). Inst. fuer Hochfrequenztechnik.
Determination of the Far-Field from Measured Near-Field Data Theory and Measuring Technique of the Near-Field Far-Field Transformations.
A. Schrott, and V. Stein. Apr 79, 109p DFVLR-MITT-79-07
Text in German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-616).

Methods for measuring the far field of antennas at distances that are small compared to the wavelength of the field are described. Both the compact test range and the near field far field transformation methods are described. Planar, cylindrical, and spherical transformation techniques are discussed. An error analysis and examples of the methods are provided.

N80-22672/3 PC **A07**/MF **A01**
AEG-Telefunken, Ulm (Germany, F.R.). Fachbereicht Roehren.
Investigation and Development of a Gas-Discharge Matrix Display with Inherent Storage.
Final Report.
M. Schiekel, K. Fahrenschon, W. Junge, G. Peppel, and R. Unbehaun. Aug 79, 126p BMFT-FB-T-79-25
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

The physical principles and technology for a dc gas discharge matrix display with storage were investigated. The storage of the device is based on the dynamic properties of the discharge. The display cells were addressed with pulses of less than 2 microseconds width making a limitation of the current with resistors unnecessary. In order to shorten the write-pulses, auxiliary discharges were used so as to supply the display cells with ions and metastables. The technology for fabricating devices of 100 x 100 sq mm was elaborated and a demonstration device was built.

N80-22736/6 PC **A04**/MF **A01**
Cincinnati Univ., OH. Dept. of Aerospace Engineering and Applied Mechanics.
Geometric Modeling and Analysis of Large Latticed Surfaces.
A. H. Nayfeh, and M. S. Hefzy. Apr 80, 65p
NASA-CR-3156
Grant NSG-1185

The application of geometrical schemes, similar to geodesic domes, to large spherical antenna reflectors was investigated. The shape and size of flat segmented latticed surfaces which approximate general shells of revolution, and in particular spherical and paraboloidal reflective surfaces, were determined. The extensive mathematical and computational geometric analyses of the reflector resulted in the development of a general purpose computer program capable of generating the complete design parameters of the dish. The program also includes a graphical self contained subroutine for graphic display of the required design.

N80-22779/6 PC **A06**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
Solar Power Satellite (SPS) Solid-State Antenna Power Combiner.
Final Report, 13 Jun. 1979 - 31 Jan. 1980.
29 Feb 80, 108p NASA-CR-160574, D180-25895-1
Contract NAS9-15636

A low loss power-combining microstrip antenna suitable for solid state solar power satellite (SPS) application was developed. A unique approach for performing both the combining and radiating function in a single cavity-type circuit was verified, representing substantial refinements over previous demonstration models in terms of detailed geometry to obtain good matching and adequate bandwidth at the design frequency. The combiner circuit was designed, built, and tested and the overall results support the view that the solid state power-combining antenna approach is a viable candidate for a solid state SPS antenna building block.

PAT-APPL-6-121 948 PC **A02**/MF **A01**
Department of the Navy Washington DC
Transmissive and Reflective Liquid Crystal Display.
Patent Application,
William H. McKnight, Larry B. Stotts, and Michael A. Monahan. Filed 15 Feb 80, 15p AD-D007 174/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A visual display has an increased readout capability due to its operation in the transflective mode. A source of ambient light and light for radiation through the display from the backside together assure the increased readout capability. Heretofore, ambient light would degrade or washout a display making it nearly impossible for monitoring personnel to decipher alphanumeric or pictorial displays due to the decreased contrast. A pair of linear polarizers sandwich a twisted nematic liquid crystal and have their polarization axes either parallel or mutually orthogonally disposed so that the crystal will present bright or dark areas in response to applied potentials. Because a partially transmitting mirror is interposed between the sandwiched liquid crystal and the radiating light source, the ambient light augments the radiated light to enhance the visual display. (Author)

PAT-APPL-6-135 039 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Langley Station, VA.
An Image Readout Device with Electrically Variable Spatial Resolution.
Patent Application,
H. F. Benz. Filed 28 Mar 80, 12p N80-22661/6, NASA-CASE-LAR-12633-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The use of a standing acoustic wave charge storage device as an image readout device is described. A frequency f sub 1 is applied to the storage transfer device to create a traveling electric field in the device in one direction along a straight line. A second frequency f sub 2 which is a harmonic of f sub 1, has the same amplitude, and is phase stable with f sub 1 and is applied to the charge transfer device to create a traveling electric field in the opposite direction. Consequently, a standing wave is created along the straight line. When an image is focussed on the charge transfer device, light is stored in the wells of the standing wave. When the frequency f sub 2 is removed, the stored charges are moved to an output terminal. This terminal is connected to a utilization device where the received charges represent the image on the surface of the charge transfer device along a projection of the straight line.

PAT-APPL-6-137 177 PC **A02**/MF **A01**
Department of the Navy Washington DC
Multi-Mode Microwave Lens Antenna.
Patent Application,
Kazumasa Doi. Filed 4 Apr 80, 14p AD-D007 168/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An antenna system having a multiple of antenna feeds to drive a microwave lens, composed primarily of a Luneberg lens and a metallic ground plane upon which are mounted three antenna feeds and a shorted stub (or four bent-stub coaxial feeds). The antenna system uses a common aperture to provide antenna performance for the three separate feeds, conserving space that would normally be required for three separate high gain antennas. (Author)

PAT-APPL-6-138 640 PC **A02**/MF **A01**
Department of the Navy Washington DC
Improved Chirp Filters/Signals.
Patent Application,
James N. Alsup. Filed 9 Apr 80, 15p AD-D007 166/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A discrete chirp generator produces discrete chirp signals which correspond to either of two exponential functions, namely the functions exp (j pi (m sq + alpha)/N) or exp (j pi (m(m+beta)+alpha)/N), where m equal 0, 1, 2, ..., M. Typically, M and N might both have the value 256. Similarly, a discrete chirp filter is described by it's impulse response which has one of these same two functional forms. These two new components (discrete chirp generator and discrete chirp filter) can be used to implement (a) an improved type of frequency synthesizer, and (b) an improved type of discrete Fourier transformer. In the former, a single generator is used in conjunction with delay, conjugation, multiplication, and low-pass filter components to achieve an improved synthesizer. In the latter, either of the two discrete chirp function generators is combined with an input signal g sub n in a multiplier. (Author)

PATENT-4 187 549 Not available NTIS
Department of the Navy Washington DC
Double Precision Residue Combiners/Coders.
Patent,
James W. Bond, and Gary A. Dressel. Filed 5 Sep 78, patented 5 Feb 80, 11p AD-D007 192/8, PAT-APPL-939 642
Supersedes PAT-APPL-939 642-78, AD-D005 460.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Apparatus, useful in signal processing, and which can be used for modulo (2 to the n power -1) addition, subtraction, coding, and decoding, has a plurality of 2n input means: n means for receiving a signal I sub 0, I sub 1, ..., I sub n-1, and another n means for receiving a signal J sub 0, J sub 1, ..., J sub n-1. A plurality n of means, connected to the n I signal input means, may switch each input means so that it is connected alternately into one of two connecting points, a first and a second connecting point. A plurality n of means is connected to the n first connecting points, for inverting the polarity of a signal received at its input, the output of the inverting means being connected to its associated second connecting point. A plurality n of three input adding means, has one input connected to the output of the inverting means, and another being connected to an associated means for receiving a J signal, the means adding the two inputs. The plurality n of adding means are circularly connected to each other, by a third input in the manner of a full adder. Means, having its n inputs connected to the n adding means, add the n-inputs in an AND manner. A second means, whose input is connected to the output of the n-input adding means, inverts the signal at its input.

PATENT-4 197 544 Not available NTIS
Department of the Navy Washington DC
Windowed Dual Ground Plane Microstrip Antennas.
Patent,
Cyril M. Kaloi. Filed 28 Sep 77, patented 8 Apr 80, 13p AD-D007 183/7, PAT-APPL-837 058
Supersedes PAT-APPL-837 058-77, AD-D004 463.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington DC 20231 $0.50.

Microstrip antenna systems having two ground planes spaced apart by a dielectric substrate and radiating elements coplanar with one of the two ground planes, or sandwiched within the dielectric substrate separating the two ground planes adjacent a window in one of the ground planes. The two ground planes are shorted together in most instances, and the dual ground plane system provides a reduction in the leakage losses of transmission lines feeding and/or interconnecting the microstrip antenna radiating elements. The dual ground plane system also provides a reduction in coupling between arrayed radiation elements as well as an increase in bandwidth, in some instances. (Author)

PB80-811128 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Integrated Circuit Reliability. April, 1976-May, 1980 (Citations from the NTIS Data Base).
Rept. for Apr 76-May 80,
William E. Reed. Jun 80, 203p
Supersedes NTIS/PS-79/0602 and NTIS/PS-78/0579. See also 1964-March, 1976, NTIS/PS-77/0485.

The bibliography presents research pertinent to design, reliability prediction, failure and malfunction, processing techniques, and radiation damage. (This updated bibliography contains 193 abstracts, 17 of which are new entries to the previous edition.)

10. ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

ALO-5350-1 PC **A09**/MF **A01**
Trident Engineering Associates, Inc., Annapolis, MD.

Survey and Evaluation of Current Design of Evacuated Collectors. Final Technical Report.
B. J. Graham. 30 Sep 79, 192p
Contract EM-78-C-04-5350

The general development of these collectors, is described and a description of numerous evacuated collectors is given which vary from collectors that have been widely used in various applications to others which are still being developed in the laboratory. A table summarizing all of the available collectors, along with their characteristics, is presented. There are four evacuated collectors which have been tested, used in demonstration sites, and developed for the market. These collectors are described in detail, and they are compared in performance and cost with a well-engineered, double glazed, selectively coated, flat plate collector. A rather simple model system of about 2000 ft exp 2 of collector area for each of the four evacuated collectors and the flat plate collector is described, along with the support structure and the piping for each. Details of the cost are presented in order to compare collector costs with component costs. All of the available efficiency curves of collectors were plotted for comparison with the efficiency curve of a good, flat plate collector. To show the extent of use of evacuated collectors, a list according to manufacturers and to location of all of the sites at which these collectors are being used is presented. (ERA citation 05:017576)

CONF-7909120-1 PC **A02**/MF **A01**
Argonne National Lab., IL.
Energy Consumption, Conservation and Recovery in Municipal Wastewater Treatment: An Overview.
M. F. Bender. 1979, 6p
Contract W-31-109-ENG-38
Seminar on aquaculture systems for wastewater treatment, Davis, CA, USA, 11 Sep 1979.

The potentials for energy consumption, conservation, and recovery at municipal wastewater treatment plants are relatively small compared to the national energy figures. Nevertheless they are significant, particularly to local owners and operators. Estimates of energy consumption, as well as opportunities for conservation and energy recovery in municipal wastewater treatment operations, are reviewed. The relationship between energy conservation and aquaculture based wastewater treatment systems is also introduced. Finally, current DOE activities in this area are presented. (ERA citation 05:016093)

CONF-791170-1 PC **A02**/MF **A01**
Argonne National Lab., IL.
Soldier's Grove: Organizing and Making the System Work.
N. F. Kron, Jr. 1979, 12p
Contract W-31-109-ENG-38
New dimensions of growth for the 1980's and beyond: transformations conference, Milwaukee, WI, USA, 7 Nov 1979.

Soldier's Grove, Wisconsin floods periodically. LaFarge Dam was to eliminate the problem, but the project did not come to fruition.. Following the 1978 flood, the townspeople decided it would be easier to move the town than to tame the river. The Soldier's Grove Relocation Authority gained support and organized technical, financial, and support groups to plan an energy community. Through this process, Argonne provided the town with information on solar potentials and put together a conceptual design for a wood-fired central heating and cooling system. The town gained the preliminary design of the wood energy system and additional chances for funding support. It is concluded that the organizational arrangement found in Soldier's Grove can probably be replicated elsewhere. (ERA citation 05:015869)

COO-2577-19(Exec.Sum.) PC **A02**/MF **A01**
Colorado State Univ., Fort Collins. Solar Energy Applications Lab.
Comparative Performance of Two Types of Evacuated Tubular Solar Collectors in a Residential Heating and Cooling System. Final Report, October 1 1977-September 30 1978 (including 1974-1977 Operating Results Comparisons).
G. O. G. Loef, and W. S. Duff. Sep 79, 16p
Contract EY-76-S-02-2577

Two types of evacuated tubular solar collectors have been operated in space heating, cooling, and domestic hot water heating systems in Colorado State University Solar House I. An experimental collector from Corning Glass works supplied heat to the system from January 1977 through February 1978, and an experimental collector from the Philips Research Laboratory, Aachen, which is currently in use, has been operating since August 1978. A flat absorber plate inside a single-walled glass tube is used in the Corning design, whereas heat is conducted through a single glass wall to an external heat exchanger plate in the Philips collector. The respective aperture areas are 50.0 m exp 2 and 44.7 m exp 2 . Since system designs and conditions of operation were not identical, efficiencies and energy deliveries of the two evacuated tubular collectors should not be compared without recognition of these factors. But in comparison with conventional flat plate collectors, both types show substantially reduced heat losses and improved efficiency. (ERA citation 05:015430)

DOE/AD-0010/8 PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Selected DOE Headquarters Publications October 1979-March 1980.
Mar 80, 35p

Selected DOE Headquarters Publications provides cumulative listings of and an index to DOE headquarters publications issued since October 1979. (Publications issued during October 1977-September 1979 are covered in DOE/AD-0010/6.) Three types of headquarters publications are included: publications dealing mainly with program and policy that are attributed to and issued by headquarters organizations, reports prepared by contractors (and published by DOE) to describe research and development work they have performed for the Department under 01-type (Headquarters) contracts, and environmental development plans and impact statements. Certain publications are omitted. They include such items as pamphlets, fact sheets, bulletins, newsletters, telephone directories, headquarters publications issued under the DOE-tr and CONF codes, technical reports from the Jet Propulsion Laboratory and NASA issued under DOE/JPL/ and DOE/NASA codes, and weekly/monthly reports of the Energy Information Administration. (ERA citation 05:017279)

DOE/AD/6038-1 PC **A09**/MF **A01**
Hayes, Seay, Mattern and Mattern, Roanoke, VA.
Multiprogram Laboratory General Purpose Facilities Studies: An Approach to Bringing Institutional Facilities to a Level of Adequacy Consistent with DOE Missions.
Dec 79, 189p
Contract EW-78-C-05-6038

The planning effort is concerned with facilities, i.e., the buildings, utilities, and roads, of DOE's multiprogram laboratories. An analysis of the needs of the DOE mission and program tested against the ability of the existing physical plants to accommodate those needs constitutes the basis of the effort. For each deficiency identified, solutions have been formulated as capital construction projects. Solutions which can be effected through maintenance and repair expenditures are the responsibility of each installation director and are not included herein. Management of facilities is a comprehensive process which includes organizational responsibilities, budget techniques, construction, operation and maintenance, site planning, and other similar functions. This document represents a systematic approach to identifying solutions to the problems of existing facilities, a component part of the overall facilities management program. Ten DOE multiprogram laboratories are addressed in the plan. (ERA citation 05:013752)

DOE/ER/10085-T1 PC **A06**/MF **A01**
Donovan, Hamester and Rattien, Inc., Washington, DC.
Investigating Load Management Technology Options: A Survey of Technologies and Issues. Final Report.
Dec 79, 112p
Contract FG045-79ER10085

Load-management-technology options are commercially available and may be desirable in many utility-service areas. Energy-conservation and renewable-energy-supply technologies are also cost-effective in many applications and, where installed, may reduce the effectiveness and attractiveness of load-management options. Recent energy legislation has not addressed these competitive interrelationships; future legislation is unlikely to do so unless a coordinated task-force effort among relevant DOE offices is pursued to derive strategic technology and policy recommendations on this issue. R and D strategies should help formulate these recommendations. (ERA citation 05:015925)

DOE/IA-0009/1 PC **A13**/MF **A01**
Department of Energy, Washington, DC.
Joint Peru/United States Report on Peru/United States Cooperative Energy Assessment. Volume 1. Executive Summary, Main Report and Appendices.
Aug 79, 299p

In 1978, the US and Peru conducted a comprehensive assessment of Peru's energy resources, needs, and uses and developed several alternative energy strategies that utilize the available resources to meet their energy requirements. This Volume I reports the findings of the assessment and contains the executive summary, the main report, and five appendices of information that support the integrated energy supply and demand analysis. The following chapters are included: The Energy Situation in Peru (economic context and background, energy resources and production, energy consumption patterns); Reference Supply and Demand Projection (approach, procedures, and assumptions; economic projections; energy demand and supply projections; supply/demand integration; uncertainties); and The Development of Strategies and Options (the analysis of options; strategies; increased use of renewables, hydropower, coal; increased energy efficiency; and financial analysis of strategies). (ERA citation 05:015981)

DOE/IA-0009-2 PC **A08**/MF **A01**
Department of Energy, Washington, DC.
Joint Peru/United States Report on Peru/United States Cooperative Energy Assessment. Volume 2. Annex 1.
Aug 79, 166p

An examination of the energy sources of Peru was undertaken by the USA in collaboration with Peru. First, an introduction establishes the purpose and summarizes results, after which the status of energy supply is presented. The ensuing sections contain the contributions of the participating technical specialists, namely: Peru's hydrocarbon potential, estimated reserves, and projected production rates; coal deposits in Peru; geothermal energy; uranium; miscellaneous energy sources; energy-related minerals; water resources in Peru; and geologic hazards in Peru. A separate abstract was prepared for each of the sections. (ERA citation 05:015905)

DOE/PE/6089-1 PC **A09**/MF **A01**
Industrial Research Inst. Research Corp., St. Louis, MO.
Study of Energy R and D in the Private Sector.
Jan 80, 198p
Contract EX-77-C-01-6089

This study supplies DOE with information pertinent to the formulation of realistic national energy research policies and facilitates cooperation between government and business in the development and commercialization of new and improved energy technologies. The study gathered information on the amount of energy-related research and development that private companies are doing, types of energy-related programs they report, and their perceptions about appropriate areas for government support. Mail questionnaires obtained data on the amount of corporate research funding in specific energy-related technology areas and the interviews gathered information on corporate energy strategies, major commercial activities, and specific research plans in four major areas - conservation, supply, energy production and transmission, and new products. (ERA citation 05:013673)

DOE/TIC-11061(V.1) PC **A03**/MF **A01**
Missouri River Basin Commission, Omaha, NE.

Missouri River Basin State and Federal Water and Related Land Resource Program: Fiscal Years 1979-1985. Volume 1. Federal Agency Program Descriptions and Generalized Summary Tables.
Dec 78, 47p

This Volume 1 of 11 of the Missouri River Basin state and Federal water and related land resource program (summary tables) was previously cited in Energy Abstracts for Policy Analysis. (ERA citation 05:015883)

DOE/TIC-11092 PC **A99**/MF **A01**
Department of Energy, Washington, DC. Economic Regulatory Administration.
Energy Emergency Handbook.
1979, 700p

The handbook is designed to aid those needful of making decisions during a short-term energy emergency, those in private industry and state and local government. It identifies selected state and Federal measures available to mitigate the impact of an energy emergency, and provides a comprehensive energy emergency communications directory. In the case of state remedial actions, particular emphasis has been placed on typical implementation procedures and likely impacts. The discussions of Federal actions focus on initiation and implementation procedures. The directory is designed to facilitate communications of all types (telephone, Telex, TWX, or facsimile) among key energy-emergency officials in the Federal and state governments. (ERA citation 05:013658)

EPRI-EA-1180 PC **A06**/MF **A01**
Stanford Univ., CA. Dept. of Operations Research.
Energy Transition Strategies: A Progress Report.
A. S. Manne. Sep 79, 117p

Energy Transition Strategies is an EPRI project that has examined different aspects of the long-term problem of transition from scarce to abundant energy resources. This report presents three papers that were produced as part of that project. The first paper, A Decision Analysis of the US Breeder Reactor Program by Alan S. Manne and Richard G. Richels, applies the ETA-MACRO model to the debate over breeder R and D strategy. The second paper, Alternative Models of Energy Demand by Sergio Granville (EAPA 5:2810), examines the econometric evidence on the elasticity of substitution. The third paper, Exhaustible Resource Models: The Value of Information by Hung-po Chao, extends the Hotelling-Nordhaus exhaustible resource model by (1) allowing for a gradual shift to the backstop technology and (2) allowing for uncertainty about the cost of this backstop and the price elasticity of energy demand. The Summary of the report also abstracts four other papers produced by the project: ETA-MACRO: A Model of Energy-Economy Interactions EAPA 4:2289, The Fable of the Elephant and the Rabbit; Probability Assessments and Decision Analysis of Alternative Nuclear Fuel Cycles; and Energy Transition Strategies for the Industrialized Nations. (ERA citation 05:015906)

HEDL-TME-79-75 PC **A04**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
DND: A Model for Forecasting Electrical Energy Usage by Water-Resource Subregion.
J. C. Sonnichsen, Jr. Feb 80, 52p
Contract EY-76-C-14-2170

A forecast methodology was derived from principles of econometrics using exogenous variables, i.e., cost of electricity, consumer income, and price elasticity as indicators of growth for each consuming sector: residential, commercial, and industrial. The model was calibrated using forecast data submitted to the Department of Energy (DOE) by the nine Regional Electric Reliability Councils. Estimates on electrical energy usage by specific water-resource subregion were obtained by normalizing forecasted total electrical energy usage by state into per capita usage. The usage factor and data on forecasted population were applied for each water resource subregion. The results derived using the model are self-consistent and in good agreement with DOE Energy Information Administration projections. The differences that exist are largely the result of assumptions regarding specific aggregations and assignment of regional-system reliability and load factors. 8 references, 2 figures, 13 tables. (ERA citation 05:015907)

IDO-1570-T21 PC **A05**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
State-of-the-ART Review of Computer Control in the Steel Industry.
C. L. Kusik, M. R. Mounier, and G. J. Kucinkas.
Jun 79, 99p
Contract EY-76-C-07-1570

To develop and demonstrate cost-effective, energy-conserving programs, the Federal Government has implemented a cost-shared program with the iron and steel industry which, if successful, would significantly reduce the nation's dependence on all forms of energy, particularly on petroleum-based fuels. An appropriate Federal role is one of supporting development programs showing good potential of being economic, but not being funded by the private sector for various reasons, including (1) the risk of failure being such that the private sector will not undertake the work, and (2) benefits being so generally dispersed among different firms that no one private organization has sufficient incentive to fund the required research, development, and testing. This document provides the Department of Energy with a state-of-the-art assessment on computer control in the iron and steel industry and identifies program areas having energy-conservation potential by greater application of computer control. Program areas must be technically feasible, show a potential for energy conservation (especially scarce fuels), and be realistic in terms of ultimate application to a steel mill environment. (ERA citation 05:013797)

IEA-INF-064 PC **A05**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil). Centro de Engenharia Nuclear.
Alternative New Energy Options for Brazil.
J. A. Lane. Oct 78, 86p
U.S. Sales Only.

A brief survey is presented on the technology state of development and economics of the new alternative energy sources which might in the future become viable energy options for Brazil. (Atomindex citation 10:463789)

INIS-mf-4149 PC **A02**/MF **A01**
Kraftwerk Union A.G., Muelheim an der Ruhr (Germany, F.R.).
Effects of a Nuclear Energy Moratorium on the Electric Energy Supply and the Economic Situation of the Federal Republic of Germany.
Feb 77, 16p
In German.
U.S. Sales Only.

Putting through the latest conceptions of the BMI (Ministry of the Interior) on waste management and waste management provision would mean that the start to building the nuclear power plants due for erection licences would be delayed by at least another 12 months and that the capacity of nuclear power plants available in 1985 would fall short by some 10,000 MW of the Federal government's expectations. Putting through the conceptions concerning the immediate enforceability of nuclear licences leads to a constantly increasing energy supply gap. This would even open the way for an economically critical situation to be created legally. The introduction of actions brought by joint associations would increase this danger still further. The effects of a moratorium for the construction of nuclear power plants in the FRG imperil the existence of the nuclear industry and of nuclear engineering to the utmost and endanger the important and future-oriented exports. Energy which is not made available in good time and in adequate quantities can lead to far-reaching economic consequences and to the loss of some million working places. Rectifying measures at a later date is not possible because of the long planning, licensing and construction periods of power stations and on account of the declining capacities following a moratorium. (Atomindex citation 09:368428)

LETC/RI-79/2 PC **A04**/MF **A01**
Department of Energy, Laramie, WY. Laramie Energy Technology Center.
Oil Shale Resources of the Naval Oil Shale Reserve No. 1, Colorado.
J. W. Smith, T. N. Beard, and L. G. Trudell. Jun 79, 67p

The resource of potential oil represented by Green River Formation oil shale on Naval Oil Shale Reserve No. 1 (NOSR No. 1) in the southeast corner of Colorado's Piceance Creek Basin is evaluated in detail. NOSR No. 1 is the site of intensive long-term oil-shale development studies and is the source of innumerable oil-shale samples for all manner of testing. A brief history of these studies is presented. This oil-shale resource is defined from oil-yield assay data on 33 cores plotted as histograms and correlated into cross sections. Contour maps of thickness, richness and oil resource in place are presented for the Mahogany Zone, the rich zone in the Mahogany zone, and for 2 units beneath and 5 units above the Mahogany zone. Total oil shale resource on NOSR No. 1 is 20.4 billion barrels of which 17.4 billion barrels are particularly suitable for development by vertical modified in-place processes. A previously unknown Mahogany zone outcrop providing much additional development access is described. Now under sole control of the US Department of Energy (DOE), NOSR No. 1 offers DOE a unique site for oil shale testing and development. (ERA citation 05:014838)

N80-22783/8 PC **A14**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Handbook of Solar Energy Data for South-Facing Surfaces in the United States. Volume 1: An Insolation, Array Shadowing, and Reflector Augmentation Model.
J. H. Smith. 15 Jan 80, 312p NASA-CR-162998, DOE/JPL-1012-25-V-1
Contracts NAS7-100, EX-76-A-31-1012

A quick reference for obtaining estimates of available solar insolation for numerous locations and array angles is presented. A model and a computer program are provided which considered the effects of array shadowing reflector augmentation as design variables.

N80-22784/6 PC **A20**/MF **A01**
Jet Propulsion Lab., California Inst. of Tech., Pasadena.
Handbook of Solar Energy Data for South-Facing Surfaces in the United States. Volume 2: Average Hourly and Total Daily Insolation Data for 235 Localities. Alaska - Montana.
J. H. Smith. 15 Jan 80, 473p NASA-CR-162999, DOE/JPL-1012-25-V-2
3. Sponsored by NASA and Doe, Washington, D. C.

Average hourly and daily total insolation estimates for 235 United States locations are presented. Values are presented for a selected number of array tilt angles on a monthly basis. All units are in kilowatt hours per square meter.

N80-22785/3 PC **A21**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Handbook of Solar Energy Data for South-Facing Surfaces in the United States. Volume 3: Average Hourly and Total Daily Insolation Data for 235 Localities. North Carolina - Wyoming.
J. H. Smith. 15 Jan 80, 476p NASA-CR-163000, DOE/JPL-1012-25-V-3
3. Sponsored by NASA and Doe, Washington, D. C.

The daily and hourly profiles used to compute total insolation data for 235 locations in the United States are presented.

N80-22856/2 PC **A05**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Performance Evaluation: Seasonal Report for Fern, Tunkhannock, Pennsylvania.
Contractor Report, May 1978 - Apr. 1979.
Jan 80, 81p NASA-CR-161392
Contract NAS8-32036
Sponsored in Part by DOE.

The operational and thermal performance of a variety of solar systems installed in operational test sites are described. The analysis is based on instrumented system data monitored and collected

for at least one full season of operation. The long-term field performance of the installed system is reported, and technical contributions to the definition of techniques and requirements for solar energy system design are made. The solar energy system was designed to supply space heating and domestic hot water for single-family residences. The system consists of air flat plate collectors, storage tank, pumps, heat exchangers, associated plumbing, and controls.

N80-22857/0 PC **A11**/MF **A01**
Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (Germany, F.R.). Unternehmensbereich Raumfahrt.
Development and Preparation for Series Production of a Modular Solar Space Heating System, Phases 1 and 2.
Final Summary Report.
R. Elchlepp, H. Grallert, V. Merges, and K. H. Ott. May 79, 247p BMFT-FB-T-79-02
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. Und Technol.

A modular solar space heating system for residential use at central European latitudes was examined experimentally. Technical as well as economic factors were included. The system selected for the experimental test consisted of flat plate solar collectors and cubic water tanks for energy storage. Two test houses in Germany were equipped with this system, both of then single-family houses. One of these houses is a special, newly constructed prefabricated home, the other was retrofitted with the system. Results are presented.

N80-22859/6 PC **A07**/MF **A01**
Dornier-Werke G.m.b.H., Friedrichshafen (Germany, F.R.).
Development of a 5.5 M Diameter Vertical Axis Wind Turbine, Phase 2.
Final Report.
G. Binder, A. Fritzsche, A. Vollan, A. Dekitsch, and R. Joos. Jul 79, 138p BMFT-FB-T-79-04
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

The design work for the turbine, including the aerodynamic and structural dynamic investigations was performed, and the wind turbine built and tested in a wind tunnel. The rotor diameter of 5.5 m is not only a suitable size for the tests, but indicates that the results will contribute to the experimental data required for the design of large converters. The layout of the rotor, the construction methods and choice of materials favor series production, applying advanced mass production technology, without excluding the manufacture in developing countries. The wind tunnel test performed with the two, three, and four blade version of the Darrieus-rotor and with Savonius-rotors of different heights confirmed the aerodynamic calculations. Possibilities to improve the efficiency of the Savonius-rotor and to simplify some details concerning design and manufacture were evaluated.

N80-22860/4 PC **A12**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer die Technische Nutzung Solarer Energie.
Technical Applications of Solar Energy.
Final Report.
A. Arafa, W. Arndt, and G. Bilger. Jul 79, 272p BMFT-FB-T-79-06
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

Experimental and theoretical investigations of the conversion of solar energy are presented, including: laboratory investigations with flat plate water collectors; hot water heat storage; development and measurements of selective surfaces; thermoelectric energy conversion; measurements of meteorological and radiation data; data acquisition; outdoor testing of water and air flat plate collectors; and measurement of the energy balance in a solar house. Photovoltaic experiments with flat and concentrating generators, a system study on photovoltaic systems, hybrid flat plate collectors (thermal and photovoltaic), and technology of Cu2S-CaS thin film solar cells are included. The improvement of solar cell use by light conversion with luminiscent substances and time resolved measurement of the global radiation spectrum is also considered.

PB80-172869 PC **A04**/MF **A01**
California Innovation Group, Inc., San Jose.
Urban Energy Management Study. Supplement to Final Report. Final Report Summary: Implementation.
Sep 77, 65p HUD-0000893
Contract FEA-CA-12-50093-00, Grant HUD-B-75-SI-06-0501

This final report, part of a study to determine the possibilities for local government management of energy - related problems, summarizes implementation measures taken in conjunction with the overall study as of September 1, 1977. The overall study was prepared by the staff of the City of Anaheim, Calif., with assistance from the California Innovation Group (CIG) and a consultant, as part of the Urban Energy Management Program (UEMP). The report summarizes the end - products of the UEMP, such as (1) a survey and evaluation of municipal energy conservation techniques (street lighting, vehicle fleets, heating and cooling of city buildings) for Anaheim and other CIG members; (2) a study of energy supply and demand patterns in the community of Anaheim; and (3) preparation of an energy management plan for Anaheim, including an evaluation of different conservation and supply techniques. In addition, three energy management workshops for local government were held in California, with over 40 local officials sharing their experiences on street lighting, pool covers, vehicle fleets, and other topics. Currently, the city has two large scale, energy - related programs: (1) Anaheim's electric utility is participating in the design and implementation of the Intermountain Power Project, and (2) all city departments are developing long - term plans for the conservation of energy in their operations. Other energy - conserving activities are described for Anaheim and other CIG cities, including Huntington Beach and Garden Grove, Pasadena, San Diego, San Jose, Burbank, Santa Clara, and Fresno. Non - CIG cities are also beginning to model their energy programs after the Anaheim UEMP, such as Torrence, Calif., which recently created an energy conservation citizen task force to suggest energy conservation measures. The UEMP demonstrates that local agencies can take a strong role in community energy management, as evidenced by the substantial progress of all CIG cities as well as the initial efforts of non - CIG cities. Appendices contain energy conservation programs of Anaheim, Huntington Beach, Garden Grove, San Jose, and Santa Clara.

PB80-173198 MF **A01**
Real Estate Research Corp., Chicago, IL. Public Affairs Counseling Div.
Capacity-Building. Local Government Approaches to Energy Conservation.
Sep 79, 54p HUD-0000993, HUD/PDR-480
Paper copy available from the Sup. of Docs., Stock number 023-000-00550-6.

HUD's Office of Policy Development and Research funded three projects to test a variety of approaches to municipal management of energy conservation. This overview of all three can be useful to other local governments faced with tight resources and bulging energy demands. It outlines the strategies used by 10 California cities, a number of Massachusetts cities, and Portland, Oreg., to develop new energy conservation plans and policies. As a whole, the projects found that better use of existing energy resources helped control rising levels of energy expenditures, reduced uncertainties and dependence caused by heavy use of imported oil, prevented overreliance on developing forms of energy while extending the time available for the efficiency of these sources to be proven, and prevented exhaustion of existing supplies. The California Innovation Group worked through an existing local government network of science advisors to identify appropriate conservation programs. Anaheim, Calif., as the lead city, analyzed energy uses and sources using supply and demand projections to determine problem areas. Eventually, an urban energy management plan was developed outlining auditing procedures, municipal codes and ordinances, and public utilities and public relations policies directed at conservation. The Massachusetts Department of Community Affairs assisted small and medium - sized cities in establishing conservation plans, worked with six municipalities in drawing up individual plans, and conducted local seminars. This led to the establishment of an ongoing agency, the Energy Extension Service. Portland established a citywide energy policy steering committee and an interdepartmental energy management task force to implement an energy conservation policy that evolved from research based on projections of demand and land use patterns. An index to energy conservation and management methods and documents, by project and subject, is provided.

PB80-178809 PC **A03**/MF **A01**
Radian Corp., Austin, TX.
An Integrated Assessment of Texas Lignite Development. Volume IV. Executive Summary,
J. C. Lacy, R. J. Davis, F. H. Sheffield, R. L. Leonard, and J. R. Stewart. Apr 79, 43p EPA-600/7-79-111D
Grant EPA-R-806539-01
Sponsored in part by Department of Energy, Washington, DC. Office of Environment, and Texas Energy Advisory Council, Austin.

This document is organized along the lines of the four major steps--or tasks--involved in the assessment: The Development Scenario task attempts to determine how much lignite development might occur and what factors influence this development; The Siting Analysis task seeks to determine where lignite and coal use is likely to occur and whether the projected number of lignite and coal facilities can be accommodated given several key siting limitations; The Impact Analysis task identifies probable environmental and socioeconomic impacts which are likely to occur based on the magnitude of development and siting patterns indicated in the first two tasks; The Policy Analysis task identifies the major policy issues which relate to each of the three preceding tasks and assesses alternative means of resolving the issues based on various policy objectives.

PB80-180441 PC **A03**/MF **A01**
Illinois Inst. of Natural Resources, Springfield.
Public Care Institutions 'Building Energy Audit' Forms for the Institutional Building Grant Program,
John Shum, Jr. 1 Nov 80, 34p ILLDOE-80/06
Sponsored in part by Department of Energy, Washington, DC. Prepared in cooperation with Contract Research Corp., Chicago, IL.

The Building Energy Audit Form is a narrow scope energy audit. When completed it will define an institution's Energy Consumption, describe the building's energy consuming structures and systems, including its potential for solar and/or renewable resource systems. A checklist of 25 typical operation and maintenance procedures recommended for review and change is included to provide a list of potential quick energy savings.

PB80-180607 PC **A09**/MF **A01**
Wisconsin Univ.-Madison. The Leonardo Scholars.
Resources and Decisions,
Jean M. Lang, and Dennis L. Fisher. c1975, 178p
ISBN-0-87872-086-3, NSF/RA/E-75-364
Library of Congress catalog card no. 74-84834.

An interdisciplinary study analyzed trends in resource supply and consumption in the United States, the institutions established to deal with these trends, and ways in which resource policy might be realigned. The investigation focused on three representative resources: copper, a nonrenewable material; wheat, a renewable resource; and energy, the lifeblood of all material production. Multiple aspects in such areas as processing, consumption, and law were probed in depth. From these studies emerged a focus for larger issues which are presented in detail. These include limitations of social organizations to direct policy change, the need for careful scrutiny of supply and demand forecasts, bad bargains resulting from hasty decisions in longterm policies, continuing conflicts over resource usage when material and energy shortages persist, conservation through new consumption patterns of material and energy, reduction in alternative sources of energy and material resulting from reliance on monopolistic economies of scale, and the greater efficacy of changing policy by numerous small steps rather than by sweeping ones. Ethical issues were considered, particularly U.S. responsibility to the well-being of poorer countries.

PB80-181290 PC **A03**/MF **A01**
Illinois Inst. of Natural Resources, Springfield.
University and College 'Building Energy Audit' Forms for the Institutional Building Grant Program,
John Shum, Jr. 1 Nov 79, 31p ILLDOE-80/05
Sponsored in part by Department of Energy, Washington, DC. Prepared in cooperation with Contract Research Corp., Chicago, IL.

The Building Energy Audit Form is a narrow scope energy audit. When completed, it will define an institution's Energy Consumption, and describe the building's energy consuming structures and systems, including its potential for solar and/or renewable resource systems. A checklist of 25 typical operation and maintenance procedures recommended for review and change is included to provide a list of potential quick energy savings.

PB80-181746 PC **A11**/MF **A01**
Urban Inst., Washington, DC.
Local Implementation of Emergency Energy Assistance: An Analysis of the 1977 and 1978 Programs.
Working paper,
Mary Jane S. Huneycutt, Richard Koenig, Jr., Mark Lincoln Chadwin, and Ena E. Castro. Jan 80, 228p WP-1197-9, CSA-LN-2547
Grant CSA-31607

Due to concern about the effects of severe winter weather and rising fuel prices, Congress appropriated $200 million in both 1977 and 1978 for programs of assistance to low income households with high energy bills. This report analyzes local implementation of the Special Crisis Intervention Program of 1977 (SCIP) and the Emergency Energy Assistance Program of 1978 (EEAP).

PB80-181878 PC **A03**/MF **A01**
Illinois Inst. of Natural Resources, Springfield.
Hospital 'Building Energy Audit' Forms for the Institutional Building Grant Program,
John Shum, Jr. 1 Nov 79, 36p ILLDOE-80/04
Sponsored in part by Department of Energy, Washington, DC. Prepared in cooperation with Contract Research Corp., Chicago, IL.

The Building Energy Audit form is a narrow scope energy audit. When completed it will define an institution's Energy Consumption, describe the building's energy consuming structures and systems, including its potential for solar and/or renewable resource systems. A checklist of 25 typical operation and maintenance procedures recommended for review and change is included to provide a list of potential quick energy savings.

PB80-182447 PC **A03**/MF **A01**
Illinois Inst. of Natural Resources, Springfield.
Local Government 'Building Energy Audit' Forms for the Institutional Building Grant Program,
John Shum, Jr. 1 Nov 79, 36p ILLDOE-80/07
Sponsored in part by Department of Energy, Washington, DC. Prepared in cooperation with Contract Research Corp., Chicago, IL.

The Building Energy Audit Form is a narrow scope energy audit. When completed it will define an institution's Energy Consumption, describe the building's energy consuming structures and systems, including its potential for solar and/or renewable resource systems. A checklist of 25 typical operation and maintenance procedures recommended for review and change is included to provide a list of potential quick energy savings.

PB80-190770 PC **A04**/MF **A01**
American Planning Association, Chicago, IL. Planning Advisory Service.
Energy in the Cities Symposium,
Joel T. Werth. Apr 80, 55p 349, HUD-0001472
Grant HUD-H-5003RG

This report addresses city government frustration in developing conservation plans and energy management strategies caused by inadequacies of staff, finance, and interagency coordination. One paper describes the planning process of the Southern Tier Regional Council in New York State designed for bringing energy problems and policy-making down to the local level. Another calls on the Federal Government to provide incentives for local government action, especially in the form of funds for energy conservation planning, supplied free of institutional barriers and penalties. Another contribution explores the relationship between the rebirth of cities and the journey to work and analyzes the potential implications of these phenomena in terms of higher energy costs. A paper on the high costs of heat views this expense as a new threat to city neighborhoods and calls for neighborhood education and outreach programs to include onsite energy counseling for inhabitants along with energy audits and technical assistance programs, while another presents ideas for advancing conservation features in the building industry using a series of incentives and regulatory policies. The final contribution examines the impact of environmental regulations, taxation, and the cost burdens on potential utility customers in the demise cogenerational systems for supplying energy. This symposium is representative of the range of efforts underway throughout the country to help local communities control their energy futures. Tabular data, illustrations, and footnotes are provided.

RLO-1021-77/1 PC **A09**/MF **A01**
AeroVironment, Inc., Pasadena, CA.
Dynamic Inducer Research Program. Final Report.
P. B. S. Lissaman, and S. N. Walker. Jun 78, 177p
Contract EG-77-C-06-1021

The Dynamic Inducer Rotor (DIR) is a novel type of wind turbine rotor which has the theoretical potential of producing as much as 160% of the power output of a conventional propeller-type horizontal axis rotor (HAR) of the same diameter. The research described here constitute three sections: an analytical development of DIR design procedure and performance prediction techniques; instrumented field tests of a 3.7-meter diameter DIR system; and a cost-effectiveness analysis of the DIR compared to the HAR. (ERA citation 05:015648)

SAN-1166-1 PC **A02**/MF **A01**
Lighting Technology Corp., Burlingame, CA.
Litek Lamp Evaluation Program.
Oct 78, 9p
Contract EY-76-C-03-1166

Testing results of the Litek lamp show that a properly coated and filled electrodeless fluorescent lamp is intrinsically efficient. There is not, nor has there been, a coupling problem except when a long transmission line was improperly employed. The line then dominated the observation. Operation of a Litek lamp at 1500 lumens output with less than 25 W of raw ac input is inevitable. Further, operation is highly probable at or near the 1760 lumen level with 25 W input; or equivalently, at the 1500 lumen level with about 21 W input. The lumen maintenance of an A-25 Litek lamp will be superior to the lumen maintenance of a common heavily loaded fluorescent lamp; thus, a preliminary estimate of Litek lamp (i.e., glass part) life can be inferred from fluorescent lamp data, i.e., 9000 to 10,000 h. The interference potential of a Litek lamp is low. Operation in the ISM band at 13.56 Mhz is appropriate and legal. Bulb shielding by means of a tin oxide coating is effective. (ERA citation 05:017796)

SAND-79-1114 PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Simulated Hail Test Facility.
D. W. Miller. Feb 80, 25p
Contract EY-76-C-04-0789

A low cost, simulated hail test facility for testing solar mirror and support materials has been developed. The facility was designed to be mounted on an existing 54.8 m (180 ft) tower. The facility consists of a 30.5 m (100 ft) vertical steel tube, an ice ball transport mechanism, and a release mechanism. It is simple to control and maintain, and it is convenient for a one-man operation. The facility was designed to operate in either a single ball drop mode or a salvo drop mode. Measured velocities of the simulated hail were within 10 percent of the calculated theoretical terminal velocities of hail in still air for diameters up to 1.9 cm (0.75 in). For larger diameter hail balls, the drop distance is too short to reach terminal velocity. (Deviations from terminal velocity are as high as 14 percent for 2.54 cm (1.0 in) diameter ice balls.) Data generated at this facility aided in the characterization of hail resistant materials for solar applications. An example of one sample material is included. Test procedures and alternate methods of hail testing are also discussed. (ERA citation 05:015438)

SAND-79-1990 PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Comparison with Strain Gage Data of Centrifugal Stresses Predicted by Finite Element Analysis on the DOE/Sandia 17-M Darrieus Turbine.
R. A. Watson. Feb 80, 21p
Contract EY-76-C-04-0789

By the use of strain gages, the blade structural response to purely centrifugal loading was measured on the DOE/Sandia 17-m Darrieus rotor. The measurements obtained are compared in this report with MARC-H nonlinear finite element stress predictions. It was necessary to include gravitational effects in the finite element model to explain certain asymmetries in the data. The model with gravitational effects shows good agreement with the data. Examination of results suggests that refinement of the model to include more structural detail in the region where the blade joins the tower would probably enhance the accuracy of the model. (ERA citation 05:015651)

SCI-79-118 PC **A12**/MF **A01**
Systems Consultants, Inc., Washington, DC.
Country Notebooks on Alternative Energy Sources for Australia, Japan and New Zealand.
P. Patil, I. Calder, S. Farnsworth, R. Novo, and S. Rickard. Sep 79, 275p
Contract AC01-79CS30028

Australia, Japan and New Zealand were selected because of their developing solar technology markets. For each country, information has been assembled concerning energy resources, energy economy, governmental energy activities, institutions and individuals involved in energy, and a list of project summaries. In addition, a descriptive national sketch of each country has been provided outlining relevant geographic, economic, and governmental data pertinent to an accurate and realistic assessment of the potential for solar energy commercialization. (ERA citation 05:015113)

SERI/PR-401-530 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Vocational Training Programs. Annual Report, 1 October 1978-30 September 1979.
K. O'Connor. Feb 80, 12p
Contract EG-77-C-01-4042

The following are presented for this project: scope and purpose, objectives, summary and chronology of accomplishments, and a table of the distribution of technical training programs in the United States. Included in an appendix is a summary of a Solar Energy Task Force meeting. (ERA citation 05:015389)

10B. Power Sources

AD-A083 665/0 PC **A04**/MF **A01**
Defense Intelligence Agency Washington DC
Hydrogen Technology--Foreign. Change 1.
Rept. for period ending Feb 80,
James D. Busi, and Phillip Greenbaum. 14 Apr 80, 66p Rept no. DIA-DST-1860S-522-78-CHG-1 Change 1 to Rept. no. DST-1850S-522-78, AD-A055 024.

Hydrogen is both a promising medium for the efficient storage and transmission of energy and a potential alternate fuel. Hydrogen is not a primary energy source, however, since its production is dependent upon other energy sources (thermal, electrical, and radiant). To be practicable as a fuel, hydrogen must be produced in bulk quantities with a standardized purity that will satisfy consumer specifications. In addition, improved distribution systems must make hydrogen widely available to military, industrial, and domestic consumers if the successful evolution of a hydrogen economy is to occur. The greatest potential military impact of hydrogen lies in its use as an aviation fuel. Because of its high specific energy (124 kJ/kg--2.7 times greater than conventional aviation fuels), hydrogen

has potential use as a fuel for subsonic transports, supersonic aircraft, and helicopters; however, safety measures, logistics, and storage and handling systems must be developed and standardized before this capability can be achieved. Initial experimental use of hydrogen in military aircraft may occur in the 1980s. A followup conversion and modification of aircraft and airports to hydrogen will require an additional 10 to 15 years. Secondary military interests include the use of hydrogen fuel cells for portable and transportable power generation, and its use as a propellant in aerospace applications.

AD-A083 705/4 PC **A10**/MF **A01**
General Accounting Office Washington DC Energy and Minerals Div
Industrial Cogeneration--What it is, How it Works, its Potential.
29 Apr 80, 220p Rept no. GAO/EMD-80-7
Original contains color plates: All DTIC/NTIS reproductions will be in black and white. Report to the Congress.

This is a report on the role that cogeneration can play in our Nation's efforts to conserve valuable energy resources. The cogeneration of power and heat can be employed by both industry and utilities. Since these two sectors account for about half of the fuel consumed in the United States, their acceptance of this technology can assist in accomplishing the national goals of using fuels more efficiently and decreasing the use of imported fuels. This study was undertaken because of indications that the private sector faces many constraints which limit the acceptance of cogeneration technology. Moreover, the Federal Government is one of the influential forces which can encourage greater acceptance of cogeneration. This report sets forth the characteristics of cogeneration, the factors involved in its application, and the policy option and strategy which we believe should be considered by Federal and State agencies to encourage greater cogeneration development. The report recognizes that cogeneration is very complex and interrelated with other issues such as economics, fuel availability, and environmental considerations. This report will be useful to the Congress, the executive branch, State agencies, and private industries and utilities in working together to overcome the constraints that cogeneration faces. We are also aware that several Congressmen have expressed interest in the subject, and there is an indication that some are interested in moving forward with legislation in this area. (Author)

AD-A083 961/3 PC **A06**/MF **A01**
Defence Research Establishment Ottawa (Ontario)
Evaluation of the Vertical Axis Wind Turbine at DREO,
Howard R. Braun, David J. Bristow, and Sylvia J. Wake. Jan 80, 101p Rept no. DREO-R-822
Abstract in French.

A Vertical Axis Wind Turbine-Battery Storage System was installed at the Defence Research Establishment Ottawa (DREO) in December 1975 and was operated for three years. The system was instrumented to control and monitor its operation and performance. This report deals with an evaluation study of a Vertical Axis Wind Turbine-Battery Storage System for a low-power unattended power source. The System's wind turbine, energy-generating and battery-storage system, mechanical drive system, installation, control-circuitry and data-acquisition system are described. Also, a performance-history outlining the problem areas encountered and a data-summary of two years of performance-data acquired during this study are presented. The objective of this study was to assess the System's ability to provide sixty watts of continuous power. The frequency of mechanical falures, especially in the turbine electrical drive system, made this particular system unsuitable as an unattended power source. It was also concluded that the average annual wind speed in the test location was of insufficient magnitude to provide the specified power output. (Author)

ANL/MHD-79-13 PC **A04**/MF **A01**
Argonne National Lab., IL.
MHD Heat and Seed Recovery Technology Project. Sixth Quarterly Report, April-June 1979.
M. Petrick, K. E. Tempelmeyer, and T. R. Johnson. 1979, 72p
Contract W-31-109-ENG-38

The MHD Heat and Seed Recovery Technology Project at Argonne National Laboratory is obtaining information for the design and operation of the heat and seed recovery systems downstream of the MHD channel-diffuser and the seed regeneration process. The project goal is to supply the engineering data required in the design of components for prototype and demonstration MHD facilities. The work is being done in cooperation with other DOE contractors working in this general area. The present project activities include: (1) studies of the thermochemistry of seed-slag systems, (2) investigations of ceramic and metallic materials for service in the downstream gas systems, (3) small-scale engineering studies of seed-slag deposition, (4) operation of a 2-MW experimental facility for investigations pertaining to the downstream gas system, and (5) evaluation of seed regeneration processes. (ERA citation 05:015953)

ANL/MHD-79-15 PC **A04**/MF **A01**
Argonne National Lab., IL.
Modified NASA-Lewis Chemical Equilibrium Code for MHD Applications.
R. A. Sacks, H. K. Geyer, S. J. Grammel, and E. D. Doss. Dec 79, 60p
Contract W-31-109-ENG-38

A substantially modified version of the NASA-Lewis Chemical Equilibrium Code has recently been developed. The modifications were designed to extend the power and convenience of the Code as a tool for performing combustor analysis for MHD systems studies. This report describes the effect of the programming details from a user point of view, but does not describe the Code in detail. (ERA citation 05:015946)

CONF-800104-5 PC **A02**/MF **A01**
Argonne National Lab., IL.
Convective Heat Transfer in MHD Channels and Its Influence on Channel Performance.
R. K. Ahluwalia, and E. D. Doss. 1980, 12p
Contract W-31-109-ENG-38
18. AIAA aerospace sciences meeting, Pasadena, CA, USA, 14 Jan 1980.

The limitations of the integral boundary layer methods and the potential of the differential boundary layer method in analyzing MHD channel flows are assessed. The sensitivity of results from the integral method to the parametrization of boundary layer profiles and calculation of wall heat transfer is established. A mixing-length type turbulence model for flow on rough walls is developed and validated by comparison with experimental data. The turbulence model is used in a quasi-three-dimensional boundary layer model to evaluate the influence of wall roughness and pressure gradients on the flow characteristics and performance of MHD channels. The behaviors of skin friction and Stanton number calculated from the analytical model are found to differ considerably from the empirical correlations valid for non-MHD flows without pressure gradients. (ERA citation 05:015954)

CONF-800104-6 PC **A02**/MF **A01**
Argonne National Lab., IL.
Power Take-off Analysis for Diagonally Connected MHD Channels.
Y. C. Pan, and E. D. Doss. 1980, 13p
Contract W-31-109-ENG-38
18. AIAA aerospace sciences meeting, Pasadena, CA, USA, 14 Jan 1980.

The electrical loading of the power take-off region of diagonally connected MHD channels is investigated by a two-dimensional model. The study examines the loading schemes typical of those proposed for the U-25 and U-25 Bypass channels. The model is applicable for the following four cases: (1) connection with diodes only, (2) connection with diodes and equal resistors, (3) connection with diodes and variable resistances to obtain a given current distribution, and (4) connection with diodes and variable resistors under changing load. The analysis is applicable for the power take-off regions of single or multiple-output systems. The general behaviors of the current and the potential distributions in all four cases are discussed. The analytical results are in good agreement with the experimental data. It is found possible to design the electrical circuit of the channel in the take-off region so as to achieve a fairly even load current output under changing total load current. (ERA citation 05:015955)

CONF-800104-7 PC **A02**/MF **A01**
Argonne National Lab., IL.
Heat Transfer Including Particle and Gas Radiation in Subsonic MHD Diffuser-II.
R. K. Ahluwalia, and K. H. Im. 1980, 13p
Contract W-31-109-ENG-38
18. AIAA aerospace sciences meeting, Pasadena, CA, USA, 14 Jan 1980.

Heat transfer in subsonic MHD diffusers, by convection and by gas and slag particle radiation, is analyzed by simultaneously solving the radiation transport equation and the quasi-three-dimensional gasdynamic equations. The efficiency factors for extinction and scattering by particles are calculated from the Mie theory. For a reference diffuser geometry, the heat transfer by convection is found to be 25 MW, and the radiative heat transfer varies from 44 MW to 79 MW, depending on the rate of ash carryover into the channel. Results reveal that the heat transfer is sensitive to the ash carryover into the channel, slag particles spectrum, electrical conductivity of ash, gas composition, and wall emissivity. It is observed that, because of multiple scattering, the particles shield the short wavelength radiation emitted by potassium atoms. The impacts of heat transfer enhancement by gas radiation in the channel and by gas-plus-particles radiation in the diffuser on MHD system design are assessed. It is suggested that, from the system design point of view, the diffuser be regarded as a part of the radiant boiler. No significant effect of radiation enhancement on the ability to decompose NO/sub x/ is anticipated. (ERA citation 05:015956)

CONF-800104-8 PC **A02**/MF **A01**
Argonne National Lab., IL.
Heat Transfer Including Radiation and Slag Particles Evolution in MHD Channel-I.
K. H. Im, and R. K. Ahluwalia. 1980, 13p
Contract W-31-109-ENG-38
18. AIAA aerospace sciences meeting, Pasadena, CA, USA, 14 Jan 1980.

Accurate estimates of convective and radiative heat transfer in the magnetohydrodynamic channel are provided. Calculations performed for a base load-size channel indicate that heat transfer by gas radiation almost equals that by convection for smooth walls, and amounts to 70% as much as the convective heat transfer for rough walls. Carbon dioxide, water vapor, and potassium atoms are the principal participating gases. The evolution of slag particles by homogeneous nucleation and condensation is also investigated. The particle-size spectrum so computed is later utilized to analyze the radiation enhancement by slag particles in the MHD diffuser. The impact of the slag particle spectrum on the selection of a workable and design of an efficient seed collection system is discussed. (ERA citation 05:015957)

CONF-800106-4 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Photovoltaic Applications: Past and Future.
S. I. Kaplan. 1980, 6p
Contract W-7405-ENG-26
14. photovoltaics specialists conference, San Diego, CA, USA, 7 Jan 1980.

Three planned or proposed photovoltaic projects are described. The 240-kWe system at Mississippi County Community College consists of an array of 270 106-unit strings of single-crystal Si cells mounted at the focus of 40x concentrating parabolic troughs. The system is expected to be complete in the spring of 1980. The four 50-kWp photovoltaic systems planned for Northwest Mississippi Junior College consist of different types of solar cells using different types of concentrators. The system is expected to go into operation in the summer of 1980. The proposed system for Georgetown University has not reached the hardware grant stage. (ERA citation 05:015221)

COO-4049-15 PC **A02**/MF **A01**
Management and Technical Services Co., Philadelphia, PA.
Operation, Maintenance and Modification of DOE/PETC Two-Stage MHD Pressurized Coal Combustor. Quarterly Activity Report, October 1-December 31, 1979.
28 Jan 80, 16p
Contract EY-76-C-02-4049

Efforts during the October through December 1979 fourth quarter commenced with the completion of the AVCO Diagnostic Test Section (DTS) installation downstream of the 2nd stage combustor. The high pressure cooling water system (HPCWS) supply and return piping was connected to the DTS and flow tests were run maximizing flows to each of the five (5) subassemblies. The DTS installation and flow testing were completed by the end of October, as scheduled. However, during system start-up for combustor test run SC7908, leaks developed in the DTS which caused termination of the run. The major effort the remainder of this quarter involved extensive modification to the AVCO DTS and supporting facility equipment as described in this report to prevent these leaks in the future. Also, numerous equipment and operational improvements are described which were then made to the combustor and its support systems in an effort to make operation and maintenance more controllable, reliable and safe. (ERA citation 05:015950)

COO-4094-79 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. School of Engineering.
Comparison of Two Techniques for the Simulation of PV Systems.
L. L. Bucciarelli, and B. L. Grossman. 1980, 4p
CONF-800101-10
Contract EY-76-C-02-4094
Systems simulation and economics analysis conference, San Diego, CA, USA, 23 Jan 1980.

For several years, MIT Lincoln Laboratory has conducted computer simulations of the performance of photovoltaic solar energy systems in order to size system components, to define designs of potential economic feasibility, to test various control schemes, and to monitor the performance of working systems in the field. When used as an aid-to-design, these hourly simulations step through a full year's worth of insolation and weather data at a specific geographical site. These data are available on computer tapes in the SOLMET format from the National Climatic Center. More recently, a simulation technique has been developed that does not require marching through time but instead works with probability-density functions of daily values of insolation and load as inputs while still providing estimates of the usual measures of system performance (e.g., auxiliary energy required, surplus energy thrown away, fraction of load displaced). Results obtained compare well with results previously obtained from an hourly simulation of a daytime radio station. This technique may be used to study the effect on system performance of varying degrees of correlation of load with insolation and to test the sensitivity of economic analyses to variations in utility escalation rate (discounted for inflation), PV module and balance-of-system costs. (ERA citation 05:015222)

COO-4931-T11 PC **A02**/MF **A01**
Value Engineering Co., Alexandria, VA.
OTEC Support Services. Quarterly Technical Progress Report No. 3, 15 November 1978-14 February 1979.
J. P. Walsh. 28 Feb 79, 17p
Contract ET-78-C-02-4931

System integration, system engineering, and management support services provided for the Ocean Thermal Energy Conversion Program of the Ocean Systems Branch, Division of Central Solar Technology are described. The six tasks include (1) survey, analysis, evaluation, and recommendation concerning program performance; (2) program technical monitoring; (3) development and implementation of methodology to identify and evaluate program alternatives; (4) technical assessments; (5) OTEC system integration; and (6) environment and siting considerations. (ERA citation 05:015315)

DOE/CS/05314-1 PC **A08**/MF **A01**
General Electric Co., Philadelphia, PA. Space Div.
Photovoltaic Concentrator Application Experiment to Be Located at Sea World Park, Orlando, Florida. Phase I. System Design. Final Report, June 1, 1978-February 28, 1979.
A. S. Kirpich. Dec 79, 163p
Contract ET-78-C-04-5314

The General Electric/Sea World Photovoltaic Concentrator Application Experiment will be located at Sea World's Marine Park near Orlando, Florida. The experiment will consist of nine azimuth-tracking turntable arrays, each containing twenty-four elevation-tracking parabolic trough PV concentrators of a type developed on this contract. The system will produce a peak power output of 330 kW and an annual net electrical energy of 355 MWh corresponding to an annual direct normal insolation of 1375.5 kWh/m exp 2 . A line-commutated DC/AC inverter controlled to operate at the solar array maximum power point will deliver three-phase power through a bidirectional transformer to a 13-kilovolt line serving the Sea World Park. In addition to generating electrical power, the system will produce 3.56 x 10 exp 5 ton-hours of cooling for air conditioning a nearby shark exhibit by supplying collected thermal energy to a lithium-bromide absorption chiller. With credit included for the amount of electricity that would be required to produce this cooling by a vapor compression cycle, the overall system efficiency is estimated to be 11.7 percent. (ERA citation 05:015223)

DOE/CS/4300-1 PC **A23**/MF **A01**
TRW, Inc., McLean, VA.
Industrial Cogeneration Optimization Program. Final Report, September 1979.
Jan 80, 526p
Contract EM-78-C-01-4300

This study program is part of the DOE Integrated Industry Cogeneration Program to optimize, evaluate, and demonstrate cogeneration systems, with direct participation of the industries most affected. One objective is to characterize five major energy-intensive industries with respect to their energy-use profiles. The industries are: petroleum refining and related industries, textile mill products, paper and allied products, chemicals and allied products, and food and kindred products. Another objective is to select optimum cogeneration systems for site-specific reference case plants in terms of maximum energy savings subject to given return on investment hurdle rates. Analyses were made that define the range of optimal cogeneration systems for each reference-case plant considering technology applicability, economic factors, and energy savings by type of fuel. This study also provides guidance to other parts of the program through information developed with regard to component development requirements, institutional and regulatory barriers, as well as fuel use and environmental considerations. (ERA citation 05:016067)

DOE/CS/8720-1 PC **A05**/MF **A01**
Arizona Power Authority, Phoenix.
Southwest Project: Resource/Institutional Requirements Analysis. Volume I. Executive Summary.
Dec 79, 100p
Contract EM-78-C-01-8720

This project provides information which could be used by DOE in formulating their plans for commercialization and market penetration of central station solar electric generating plants in the southwestern region of the United States. The area of interest includes Arizona, California, Colorado, Nevada, New Mexico, Utah, and sections of Oklahoma and Texas. The project evaluated the potential integration of central station solar electric generating facilities into the existing electric grids of the region through the year 2000 by making use of system planning methodology which is commonly used throughout the electric utility industry. The technologies included: wind energy conversion, solar thermal electric, solar photovoltaic conversion, and hybrid (solar thermal repowering) solar electric systems. The participants in this project included 12 electric utility companies and a state power authority in the southwestern United States as well as a major consulting engineering firm. A broad synopsis of information found in Volumes II, III, and IV is presented. (ERA citation 05:015244)

DOE/CS/95311-1 PC **A06**/MF **A01**
E-Systems, Inc., Dallas, TX.
Fresnel/Photovoltaic Concentrator Application Experiment for the Dallas-Fort Worth Airport. Phase 1: System Design, Final Technical Report, 1 June 1978-28 February 1979.
M. J. O'Neill. Mar 79, 104p
Contract ET-78-C-04-5311

This Phase I Final Report summarizes the analytical, experimental, design, and specification efforts for the first nine months of the Dallas/Fort Worth Airport Fresnel/Photovoltaic Concentrator Application Experiment. The overall objective of the complete three-phase program is to develop and demonstrate a unique photovoltaic concentrator total energy system which, when mass-produced, will provide electrical and thermal energy at costs competitive with conventional energy sources. Toward this objective, the Phase I - System Design contract has been completed, resulting in a final system design, analytical definition of system performance and economics, and a successfully tested prototype collector which fully verified performance predictions. The proposed system will utilize 245 m exp 2 of E-Systems linear Fresnel photovoltaic collectors to provide 25 kW/sub e/ (AC) of power and 140 kW/sub t/ of heat to the Central Utility Facility of Dallas/Fort Worth Airport. The electric power will be used to meet a continuous lighting load, while the thermal energy will be used to preheat boiler feedwater. Peak system efficiencies will be 10.2% electric (insolation to net AC output) and 56% thermal (insolation to net heat delivered). Annual efficiencies will be 8.4% electric and 49% thermal. Production system economics are attractive in the near term: 7 cents/kWh electricity and $7/MMBtu heat (1975 $) could be achieved by 1981 with limited production. With higher production, these costs could be halved by 1990. (ERA citation 05:015309)

DOE/ER-0041 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Office of Energy Research.
Satellite Power Systems (SPS): Concept Development and Evaluation Program, Preliminary Assessment.
Sep 79, 21p

The Satellite Power System (SPS) is an emerging concept for capturing solar energy in space for use in producing electrical energy on earth. To develop an understanding of the technical and economic feasibility and of the environmental and societal acceptability of the SPS is an enormous challenge. The Department of Energy and the National Aeronautics and Space Administration are engaged in a three-year assessment of the SPS that began in the fall of 1977 and will be completed in the summer of 1980. The DOE/NASA assessment is engaging the efforts of many organizations in the United States and is developing a large body of information. At approximately the mid-point of the assessment, this preliminary project assessment report describes what has been done and what has been learned with an emphasis on the overriding issues. (ERA citation 05:017516)

DOE/ET/11321-T1 PC **A04**/MF **A01**
EIC Corp., Newton, MA.
New Electrolytes for Direct Methane Fuel Cells. Final Report, January 10,1977-January 9, 1979.
S. B. Brummer, J. Foos, J. McHardy, J. McVeigh, and D. Toland. May 79, 74p
Contract EY-76-C-03-1363

The program is aimed at developing a fuel cell electrolyte for the direct oxidation of CH sub 4 and/or impure H sub 2 fuels. Of interest are di- and tribasic methanesulfonic acids CX sub 2 (SO sub 3 H) sub 2 and CX(SO sub 3 H) sub 3 where X is H, F, or C1. Synthetic routes to CH sub 2 (SO sub 3 H) sub 2 , CH(SO sub 3 H) sub 3 , CCl sub 2 (SO sub 3 H) sub 2 , and CCl(SO sub 3 H) sub 3 have been identified and optimized. The diphenyl ester of CF sub 2 (SO sub 3 H) sub 2 has been prepared for the first time and various approaches to CF(SO sub 3 H) sub 3 have been investigated. In parallel with the synthetic program, apparatus was designed and fabricated for the testing of the electrolytes under fuel cell conditions. A new PTFE test cell was developed for testing small amounts of electrolyte. Electrodes with low Pt loading were developed for use in electrolyte evaluation. Opti-

mum performance with H sub 3 PO sub 4 was achieved using 1 mg Pt/cm exp 2 and 1 mg TFE 30/cm exp 2 deposited on TFE tape, supported on a Au plated Ta screen, and sintered. Preliminary half cell tests using CH sub 2 (SO sub 3 H) sub 2 and CH(SO sub 3 H) sub 3 indicated that these acids are insufficiently stable for use as fuel cell electrolytes. However, tests using CCl sub 2 (SO sub 3 H sub 2) and CCl(SO sub 3 H) sub 3 were encouraging, yielding H sub 2 oxidation rates equal to or better than those using H sub 3 PO sub 4 . Stability tests were conducted by heating a sample of each acid at 130 exp 0 for 30 days under atmospheres of N sub 2 , O sub 2 , and H sub 2 . At the end of the test, each sample was analyzed for decomposition. In no case did IR analysis indicate significant decomposition and, in the case of the chloroacids, only a trace amount of free Cl exp - was observed. Conductivity measurements showed the aqueous acids to be of the same conductivity as aqueous H sub 3 PO sub 4 . The dihydrate of CH sub 2 (SO sub 3 H) sub 2 was found to be more conductive than CF sub 3 SO sub 3 H.H sub 2 O but less conductive than 100% H sub 3 PO sub 4 . (ERA citation 05:015977)

DOE/ET/15422-T2 PC **A02**/MF **A01**
ENCOTH Corp., Princeton, NJ.
Two-Dimensional Electron Temperature Profiles in Thermionic Converters. Technical Status Report No. 79-0003 for the Period July 1979.
D. E. Smith. 1979, 15p
Contract AC02-79ET15422

The electron temperature profile solution described by Timothy M. Smith in the report ENCOTH-TM79-0001 is generalized to two dimensions. The equations are written in cartesian coordinates used to solve structured electrode problems. An alaternate two-dimensional cylindrical geometry solution is trivially similar. The latter would be used to study departure from one-dimensional symmetry due to finite size electrodes and radial flows. The numerical method is described. The present work represents a partial solution of a complete two-dimensional transport, the purpose of which is the convergence of the proposed numerical approach. Also, the mathematical formulation of two-dimensional transport in electrical plasmas is given. The equations characterizing the two-dimensional transport and the electric field are selected, and a numerical method is proposed. (ERA citation 05:015966)

DOE/ET/15423-1 PC **A02**/MF **A01**
SRI International, Menlo Park, CA.
Application of Microfabrication Technology to Thermionic Energy Conversion. Progress Report No. 1, 1 May-31 October, 1979.
I. Brodie, and D. C. Gates. Jan 80, 11p
Contract AC02-79ET15423

In a theoretical and experimental program to evaluate those areas where three-dimensional microfabrication techniques could be important for improving methods of thermionic energy conversion, effort in the first reporting period has been directed toward a theoretical study of microstructures of electrodes for thermionic energy converters. The properties of a cesiated tungsten thermionic energy converter were analyzed with electrode temperatures compatible with a flame-generated heat source (T/sub c/ = 1650 exp 0 K and T/sub a/ = 700 exp 0 K), in order to estimate the efficiency, power production, and appropriate electrode spacing for microfabricated devices. The analysis yielded a maximum efficiency of 16 percent and corresponding electrical power of 11 W/cm exp 2 , requiring an emission current of 18 A/cm exp 2 . The study revealed that to attain these parameters, electrode spacing must be approximately 1 mu m, and that such a close-spaced diode with cesiated tungsten electrodes would operate approximately as a vacuum diode. That is, the principal function of the cesium would be to control the work function of the electrode surfaces. Operating at the point of peak efficiency, little space-charge limitation of the emission and little plasma resistance would be produced, because the atom/atom and electron/atom mean free paths would be larger than the interelectrode space. (ERA citation 05:015967)

DOE/ET/20516-2 PC **A11**/MF **A01**
Aerospace Corp., Los Angeles, CA. Energy and Resources Div.
Solar Thermal Small Power Systems Study, Program Summary Report. Phase II: Study Results.
D. E. Lapedes, P. K. Munjal, and L. R. Sitney. 12 Jul 79, 239p
Contract ET-78-C-03-2226

This Phase II Study of small solar power systems (SSPS) has been structured to determine conditions under which SSPS can be cost-effective sources of electric power in the US in the period 1985 to 2015. An extensive data base, which provides a discrete identification of all utility and industrial electric generating units up to and including 10 MW/sub e/ in rated capacity, has been prepared. This data base defines the market for which comparative evaluations are made of SSPS and alternative fossil-fueled power plants. The market penetration of SSPS is determined and the effect of economic incentives on accelerating the penetration is evaluated. The solar electric power system is evaluated as either a complete replacement for existing conventional electric power systems or as a repowering installation for boilers supplying steam to turbine-driven generators. The cost data used in the market penetration analysis are for a central receiver-type of small solar theral power system. While the market penetration discussed herein is for this type of SSPS, the sensitivity data in the report can be used to determine the market penetration of other types of solar thermal power systems (e.g., point focus distributed receiver) with different system costs. (ERA citation 05:013318)

DOE/ET/23006-2 PC **A02**/MF **A01**
Joint Center for Graduate Study, Richland, WA.
Solar Energy Laboratory Second Quarterly Progress Report, August 1, 1979-October 30, 1979.
L. C. Olsen. 1 Dec 79, 25p
Contract AC04-79ET23006

Efforts this past quarter emphasized the assembly of a three source deposition system, studies of the chemical composition of the surface of Cu sub 2 O substrates, continued investigation of current mechanisms in Cu/Cu sub 2 O Schottky barriers, and fabrication and characterization of Cu/SiO sub 2 /Cu sub 2 O MIS cells. Time was also devoted to further calculations of expected photocurrent from Cu sub 2 O solar cells, and thermodynamic considerations concerning the stability of interfaces in possible Cu sub 2 O cell structures. Key accomplishments include: (1) measurement of optical absorption coefficient for Cu sub 2 O; (2) completion of MBE system; (3) preliminary identification of two current mechanisms operative in Cu/Cu sub 2 O cells. (ERA citation 05:017489)

DOE/JPL/1012-21 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Modeling of Silane Pyrolysis in a Continuous Flow Reactor. Low-Cost Solar Array Project.
A. Praturi, R. Jain, and G. C. Hsu. 1 Apr 79, 48p
Contract EX-76-A-29-1012

Silane pyrolysis in a continuous flow pyrolyzer is a simple process that is currently being developed for producing solar cell grade silicon. The process involves complex phenomena, however, including thermal decomposition of silane, nucleation and growth of silicon particles, and mass and heat transfer. Modeling the effects of transport phenomena on silane pyrolysis in a continuous flow pyrolyzer is discussed. One- and two-dimensional models are developed to predict velocity, temperature, and concentration profiles in the reactor. The one-dimensional model has been implemented as a computer code. (ERA citation 05:017494)

FCR-0783(V.1) PC **A05**/MF **A01**
United Technologies Corp., South Windsor, CT. Power Systems Div.
Venture Analysis Case Study for on-Site Fuel Cell Energy Systems. Final Report.
31 Jul 78, 76p
Contract EX-77-C-01-2684

This venture analysis case study was conducted for the Department of Energy to evaluate the benefits and the consequences of commercialization of on-site fuel cell energy systems and to identify and evaluate actions required by the government or private industry to achieve commercialization. In the business venture selected for this case study, gas utility companies would own and operate efficient, clean, quiet 40-kW fuel cell power plants on the customer's premises and provide electrical and thermal energy services to the consumer upon demand. For each building, an integrated energy system is assumed where the fuel cell provides all of the electricity for lights and equipment; fuel cell heat is recovered for space and water heating; and fuel cell driven heat pumps, utilizing replenishable energy from the surroundings, provide space heating and cooling. Very high fuel utilization efficiencies, in the neighborhood of 100 percent, have been measured in testing this type system. Success of this energy service venture would depend upon gas company marketing and servicing efforts, and in turn would depend upon the manufacturer supplying reliable and economical fuel cell power plants. (ERA citation 05:015970)

FE-1760-40 PC **A06**/MF **A01**
Tennessee Univ. Space Inst., Tullahoma.
MHD Coal-Fired Flow Facility. Annual Technical Progress Report, January-December 1978.
J. B. Dicks, H. P. Markant, and L. W. Crawford. 29 Jun 79, 115p
Contract EX-76-C-01-1760

The University of Tennessee Space Institute (UTSI) reports on significant advances, as well as problems and planned research and testing, and on construction progress for the Coal-Fired Flow Facility (CFFF) during the year January 1, 1978 through December 31, 1978. Advances made and reported include the following: (1) the Fuels and Chemistry Laboratory significantly improved its capability for evaluating the performance of the MHD system and its components, (2) the UTSI data acquisition system bandwidth was increased from 0.03 to 10 Hertz so that all of the data channels can be analyzed statistically, even under frequently changing plant conditions during a run, (3) the least cost superconducting magnet useful throughout the operating range of the CFFF was determined, (4) a method for reducing NO/sub x/ at the stack to about 300 ppM (0.18 lb/10 exp 6 Btu) was demonstrated (this level is below EPA limits); the system operated with a primary combustor (operating at approximately equal to 85% of stoichiometry) and a secondary combustor, (5) seed regeneration analysis and evaluation indicates that the Direct Reduction process offers the greatest potential advantage, and (6) calculated channel parameters and experimental data have been used to calculate the limiting resistor values needed to maximize diagonal conducting wall (DCW) channel system current extraction. Other technical subjects are covered. (ERA citation 05:015939)

FE-1760-42 PC **A03**/MF **A01**
Tennessee Univ. Space Inst., Tullahoma.
MHD Coal-Fired Flow Facility. Quarterly Technical Progress Report, April-June 1979.
J. B. Dicks, L. W. Crawford, and Y. C. L. Wu. 30 Jul 79, 48p
Contract EX-76-C-01-1760

The University of Tennessee Space Institute (UTSI) reports on significant activity, planned research and testing, and conclusions for the Magnetohydrodynamics (MHD) Coal-Fired Flow Facility (CFFF) and Research and Development Laboratory. Study on the hydroscopic nature of potassium carbonate concludes that adequate precautions must be taken to prevent K sub 2 CO sub 3 and coal from sticking together due to the K sub 2 CO sub 3 particles absorbing water. Further, to prevent K sub 2 CO sub 3 from forming liquid droplets, the grinding facility's relative humidity must be controlled by operating at temperatures above 160 exp 0 F or by providing dry air to the pulverizer. Testing utilizing the USSR devices was completed. This included tests for the conductivity probe and temperature device under subsonic flow conditions and testing of the temperature device along under supersonic conditions. (ERA citation 05:015973)

FE-2341-13 PC **A04**/MF **A01**
Stanford Univ., CA. Dept. of Mechanical Engineering.
High Magnetic Field MHD Generator Program. Annual Report, July 1, 1978-June 30, 1979.
R. H. Eustis, C. H. Kruger, M. Mitchner, S. A. Self, and J. K. Koester. Aug 79, 64p

Contract EX-76-C-01-2341

Progress during this year has resulted in improved understanding, through experimental and theoretical studies, of fluctuations and nonuniformities in MHD generators, development and application of a laser fluorescence method for conductivity and temperature measurement with temporal and three-dimensional spatial resolution, measurement and prediction of the effects of Joule heating in a magnetic field on the electrode boundary-layer temperature profiles and on Hall-field breakdown, and in the development of our disk and linear generator experiments for the small six Tesla magnet. Experimental and theoretical work and advanced diagnostic techniques were carried out with the aim of developing methods that will be applied to tests in the seven Tesla magnet to be supplied by the Department of Energy in support of the present program. Theoretical work has been applied to the interpretation of the experimental results and together they provide MHD design engineers with useful tools for performance predictions. During the past year the magnet shelter and MHD assembly building modifications have been completed and put into use for our current experiments. (ERA citation 05:017790)

FE-2341-9 PC **A04**/MF **A01**
Stanford Univ., CA. Dept. of Mechanical Engineering.
High Magnetic Field MHD Generator Program. Annual Report, July 1, 1977-June 30, 1978.
R. H. Eustis, C. H. Kruger, and M. Mitchner. Aug 78, 60p
Contract EX-76-C-01-2341

The second year of the work on high magnetic field effects has seen improved understanding of fluctuations in MHD generators, improved diagnostics and development of techniques capable of three-dimensional spatial resolution, predictions of sidewall boundary layers for ETF size units with important variations from conventional fluid mechanics, and further improvement in channel construction techniques. All experimental work was carried on with the aim of developing techniques which will be applied to tests in the 7 tesla magnet. Improvements in diagnostic techniques for measuring temperature and electron concentration in the electrode wall boundary layer have made possible the elucidation of non-equilibrium electron concentrations in the near-wall region of the boundary layer. This improvement was partially brought about by incorporating the laboratory computer for data processing which permitted a large improvement in signal-noise ratio. Calculations based on the theory and experiments concerned with the insulating wall boundary layer were made for an ETF-size generator. Compared to a conventional boundary layer calculation which did not include Hartmann effects, the present method shows an increase in skin friction by a factor of about two and an increase in heat transfer by about 30%. Development of the disk and linear channels for experiments in the existing Stanford 6 tesla magnet continued. For both configurations a technique of brazing insulation material to a cooled substrate has been developed. Also brazing of lanthanum-chromite electrodes for the linear generator has been satisfactorily tested. The disk generator assembly will be tested in the magnet mock-up in early fall and the linear generator is scheduled for testing in early winter. (ERA citation 05:017789)

MIT-2295-T18-11 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Combined Cycle Research Program. Quarterly Technical Progress Report No. 11, January 1-March 31, 1979.
J. F. Louis. Apr 79, 75p
Contract EX-76-C-01-2295-018

Gas turbine-steam turbine combined cycle power plants, operating on coal or coal-derived fuels, are though by many experts to be the most practical and efficient choice for next generation electric power production. The major benefits of this combined cycle system are the potential attainment, at relatively low risk and development cost, of high efficiencies while maintaining pollutant emissions within environmental specifications. The industrial gas turbine is not without its development problems, however. Research is needed in turbine cooling, turbine materials corrosion, and fuel gas clean-up. While separate disciplines in themselves, they all closely interrelate in determining allowable turbine operating temperature and overall cycle performance. MIT has undertaken some essential work for the future development of combined cycle power plants. This three-year research program deals with critical problems related to combined cycles: turbine cooling with air and water, materials corrosion, and high-temperature fuel gas desulfurization. Research in these areas will provide data needed for turbine component design and thus serve as a necessary complement to the DOE High-Temperature Turbine Technology Program. The effort will also provide corrosion data for other metal and ceramic components and necessary information concerning high-temperature desulfurization, as well as providing accurate experimental data for input into, and verification of, the various computer simulator models under development. (ERA citation 05:015673)

N80-22775/4 PC **A06**/MF **A01**
Spire Corp., Bedford, MA.
Study Program to Improve the Open-Circuit Voltage of Low Resistivity Single Crystal Silicon Solar Cells.
J. A. Minnucci, and K. W. Matthei. 7 Feb 80, 119p NASA-CR-159833, FR-10056
Contract NAS3-20823

The results of a 14 month program to improve the open circuit voltage of low resistivity silicon solar cells are described. The approach was based on ion implantation in 0.1- to 10.0-ohm-cm float-zone silicon. As a result of the contract effort, open circuit voltages as high as 645 mV (AMO 25 C) were attained by high dose phosphorus implantation followed by furnace annealing and simultaneous SiO2 growth. One key element was to investigate the effects of bandgap narrowing caused by high doping concentrations in the junction layer. Considerable effort was applied to optimization of implant parameters, selection of furnace annealing techniques, and utilization of pulsed electron beam annealing to minimize thermal process-induced defects in the completed solar cells.

N80-22778/8 PC **A07**/MF **A01**
AiResearch Mfg. Co., Phoenix, AZ.
Concept Definition Study of Small Brayton Cycle Engines for Dispersed Solar Electric Power Systems.
Final Report, Sep. 1978 - Jun. 1979.
L. D. Six, T. L. Ashe, F. X. Dobler, and R. T. Elkins. Jan 80, 135p NASA-CR-159592, DOE/NASA/0069-79/1
Contracts DEN3-69, EX-76-A-29-1060

Three first-generation Brayton cycle engine types were studied for solar application: a near-term open cycle (configuration A), a near-term closed cycle (configuration B), and a longer-term open cycle (configuration C). A parametric performance analysis was carried out to select engine designs for the three configurations. The interface requirements for the Brayton cycle engine/generator and solar receivers were determined. A technology assessment was then carried out to define production costs, durability, and growth potential for the selected engine types.

N80-22782/0 PC **A09**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Dispersed Storage and Generation Case Studies.
K. Bahrami, J. A. Stallkamp, and A. Walton. 15 Mar 80, 187p NASA-CR-162996, JPL-PUB-79-98
Contracts NAS7-100, DE-AI01-79ET-29026

Three installations utilizing separate dispersed storage and generation (DSG) technologies were investigated. Each of the systems is described in costs and control. Selected institutional and environmental issues are discussed, including life cycle costs. No unresolved technical, environmental, or institutional problems were encountered in the installations. The wind and solar photovoltaic DSG were installed for test purposes, and appear to be presently uneconomical. However, a number of factors are decreasing the cost of DSG relative to conventional alternatives, and an increased DSG penetration level may be expected in the future.

N80-22786/1 PC **A02**/MF **A01**
AeroChem Research Labs., Inc., Princeton, NJ.
Development of Processes for the Production of Solar Grade Silicon from Halides and Alkali Metals.
Quarterly Report, 1 Jan. - 31 Mar. 1980.
C. R. Dickson, and R. K. Gould. Apr 80, 21p NASA-CR-162871, AEROCHEM-TN-212
Contract JPL-955491
Sponsored by NASA and DOE.

High temperature reactions of silicon halides with alkali metals for the production of solar grade silicon in volume at low cost were studied. Experiments were performed to evaluate product separation and collection processes, measure heat release parameters for scaling purposes, determine the effects of reactants and/or products on materials of reactor construction, and make preliminary engineering and economic analyses of a scaled-up process.

N80-22787/9 PC **A09**/MF **A01**
Mechanical Technology, Inc., Latham, NY. Stirling Engine Systems Div.
Design Study of a 15 kw Free-Piston Stirling Engine-Linear Alternator for Dispersed Solar Electric Power Systems.
Final Report, Sep. 1978 - Aug. 1979.
G. R. Dochat, H. S. Chen, S. Bhate, and T. Marusak. Aug 79, 189p NASA-CR-159587, DOE/NASA/0056-79/1
Contracts DEN3-56, EX-76-A-29-1060

A conceptual design of a free piston solar Stirling engine-linear alternator which can be designed and developed to meet the requirements of a near-term solar test bed engine with minimum risks was developed. The conceptual design was calculated to have an overall system efficiency of 38% and provide 15kW electric output. The free piston engine design incorporates features such as gas bearings, close clearance seals, and gas springs. This design is hermetically sealed to provide long life, reliability, and maintenance free operation. An implementation assessment study performed indicates that the free piston solar Stirling engine-linear alternator can be manufactured at a reasonable price cost (direct labor plus material) of $2,500 per engine in production quantities of 25,000 units per year. Opportunity for significant reduction of cost was also identified.

N80-22830/7 PC **A03**/MF **A01**
Tuskegee Inst., AL. Dept. of Electrical Engineering.
Measurement of Loss Angle, Volume Resistivity and Surface Resistivity of Insulating Materials Used on Solar Cells.
Final Report.
C. V. Doreswamy. Apr 80, 39p NASA-CR-162925
Grant NSG-8036

The complete measuring and test system developed to measure the quality and the stability of insulating materials used on solar cell arrays for space application is described. The test set up and measurements are primarily aimed at the measurement and analysis of the degradation of the electrical insulating properties of material used on solar cells. Degradation characteristics of the material subject to thermal cycling, space plasma and very high electrical fields individually and in combination can be investigated.

N80-22831/5 PC **A04**/MF **A01**
IBM Watson Research Center, Yorktown Heights, NY.
Optimization of Solar Cells for Air Mass Zero Operation and Study of Solar Cells at High Temperatures, Phase 4.
Final Report.
H. J. Hovel, and J. M. Woodall. Mar 80, 56p NASA-CR-159230
Contract NAS1-12812

The Pd contact to GaAs was studied using backscattering, Auger analysis, and sheet resistance measurements. Several metallurgical phases were present at low temperatures, but PdGa was the dominant phase in samples annealed at 500 C. Ti/Pd/Ag contacts appeared to have the lowest contact resistance. Etchback epitaxy (EBE) was compared to saturated melt epitaxy (SME) method of growing liquid phase epitaxial layers. The SME method resulted in a lower density of Ga microdro-

plets in the grown layer, although the best solar cells were made by the EBE method. Photoluminescence was developed as a tool for contactless analysis of GaAs cells. Efficiencies of over 8 percent were measured at 250 C.

N80-23102/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
An Exploratory Survey of Noise Levels Associated with a 100KW Wind Turbine.
J. R. Balombin. 1980, 20p NASA-TM-81486, E-424
Presented at the 99TH Meeting of the Acoustical Soc. Of AM., Atlanta, 21-25 Apr. 1980.

Noise measurements of a 125-foot diameter, 100 kW wind turbine are presented. The data include measurements as functions of distance from the turbine and directivity angle and cover a frequency range from 1 Hz to several kHz. Potential community impact is discussed in terms of A-weighted noise levels relative to background levels, and the intrasonic spectral content. Finally, the change in the sound power spectrum associated with a change in the rotor speed in described. The acoustic impact of this size wind turbine is judged to be minimal.

N80-23180/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Radiation Damage in High Voltage Silicon Solar Cells.
I. Weinberg, H. Brandhorst, Jr., C. K. Swartz, and V. G. Weizer. 1980, 11p NASA-TM-81478, E-412
Presented at 2ND European Symp. On Photovoltaic Generators in Space, Heidelberg, 15-17 Apr. 1980.

Three high open-circuit voltage cell designs based on 0.1 ohm-cm p-type silicon were irradiated with 1 MeV electrons and their performance determined to fluences as high as 10 to the 15th power/sq cm. Of the three cell designs, radiation induced degradation was greatest in the high-low emitter (HLE cell). The diffused and ion implanted cells degraded approximately equally but less than the HLE cell. Degradation was greatest in an HLE cell exposed to X-rays before electron irradiation. The cell regions controlling both short-circuit current and open-circuit voltage degradation were defined in all three cell types. An increase in front surface recombination velocity accompanied time dependent degradation of an HLE cell after X-irradiation. It was speculated that this was indirectly due to a decrease in positive charge at the silicon-oxide interface. Modifications aimed at reducing radiation induced degradation are proposed for all three cell types.

PB80-180839 PC **A05**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
Energy Facility Siting Workshops.
Summary rept.,
J. Cambon. Jun 78, 94p MTR-7851, NSF/OEP-7521960/19
Contract NSF-C1044, Grant NSF-OEP75-1960
See also PB-285 633.

This document summarizes the presentations and discussions addressed at a series of meetings and workshops on energy facility sitings held by the MITRE Corporation under the sponsorship of the National Science Foundation/Policy Research and Analysis Division. The following meetings and workshops are included: Increasing Efficiency and Effectiveness in Electrical Power Generation, Electric Utility Financial Problems and Potential Solutions; Second Meeting of Advisory Committee on Energy Facility Siting; Third Meeting of Advisory Committee on Energy Facility Siting; The Evolving Structure of the Electric Utility Industry; Long Run Energy Demand; Institutional Alternatives for LMFBR Development and Commercialization; Public Participation in Energy Related Decision-Making; and Public Policy Issues in Nuclear Waste Management.

PB80-182355 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Materials for Fuel Cells.
Annual rept. Jan-Dec 78,
L. H. Bennett, C. K. Chiang, M. I. Cohen, A. L. Dragoo, and A. D. Franklin. Mar 80, 89p NBSIR-80-1991

The National Bureau of Standards has undertaken a program of research on materials for fuel cells and batteries. This program includes studies of electrocatalysis in liquid-electrolyte cells and of solid electrolytes, in high-temperature cells and in batteries. This report describes the results for the second year of this program. The Materials for Fuel Cells Program at NBS during this year consisted of three major elements, which taken together reinforce each other in techniques and concepts; these elements embrace: (1) Electrocatalysis, especially hydrogen oxidation, on non-noble metals and alloys; (2) Degradation mechanisms involving solid oxygen-transporting electrolytes; and (3) Development of instruments.

PB80-183981 PC **A02**/MF **A01**
National Oceanic and Atmospheric Administration, Rockville, MD. Office of Ocean Engineering.
OTEC Cold Water Pipe: Program, Problems, and Procedures,
Terence McGuinness, and Richard S. Scotti. Mar 80, 19p NOAA-TR-OOE-5, NOAA-80032823
Prepared in cooperation with University of Southern California, Los Angeles.

The purpose of this presentation is to provide a comprehensive overview of the OTEC Cold Water Pipe program. The overview includes a discussion of the technical problems being addressed, the rationale behind the technology development program, and the analytical procedures used to define pipe behavior. Emphasis is placed on demonstrating what planning has occurred in the program plan. Anticipated outputs and application to other marine technologies are also projected. A detailed discussion is presented on the analytical models developed to define the dynamics of the cold water pipe. Analytical results are compared to model test and at-sea test data to indicate the validity of the design tools in predicting pipe motions and stresses.

PB80-810856 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Magnetohydrodynamic Generators in Power Generation. 1964-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-May 80,
William E. Reed. Jun 80, 279p
Supersedes NTIS/PS-79/0608 and NTIS/PS-78/0578.

The citations include research on performance, costs, efficiency, and design of MHD generators and their use in fusion and fission reactors, and fossil fueled plants. (This updated bibliography contains 272 abstracts, 40 of which are new entries to the previous edition.)

PB80-810906 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Thermionic Energy Conversion. June, 1977-May, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 77-May 80,
William E. Reed. Jun 80, 136p
Supersedes NTIS/PS-79/0596 and NTIS/PS-78/0591. See also 1970-May, 1977, NTIS/PS-78/0590.

Research on thermionic power generation, power plant design, converter design, and basic research on thermionic materials are cited in the bibliography. Spacecraft applications are included. (This updated bibliography contains 129 abstracts, 23 of which are new entries to the previous edition.)

PB80-811433 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Wind Power. 1977-1978 (Citations from the NTIS Data Base).
Rept. for 1977-78,
Audrey S. Hundemann. Jun 80, 263p
For the companion Published Searches of the Engineering Index Data Base, see NTIS/PS-79/0535 and NTIS/PS-79/0536.

The feasibility, use, and engineering aspects of wind power and windmills are discussed in these citations of Federally-funded research reports. Abstracts primarily cover the use of wind power for electric power generation and wind turbine design and performance. General studies dealing with comparative analyses of wind power and alternative energy sources are included, as are energy storage devices which can be used in these systems. (This updated bibliography contains 253 abstracts, none of which are new entries to the previous edition.)

PB80-811441 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Wind Power. 1978-May, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1978-May 80,
Audrey S. Hundemann. Jun 80, 305p
Supersedes NTIS/PS-79/0536 and NTIS/PS-78/0417. See also 1970-1977, NTIS/PS-79/0535.

Windmill and wind power feasibility, use, and engineering are discussed in these citations of worldwide research. Abstracts primarily cover the use of wind power for electric power generation and wind turbine design and performance. General studies dealing with the use of wind power in developing countries and comparative analyses of wind power and alternative energy sources are included, as are studies on energy storage systems. (This updated bibliography contains 299 abstracts, 174 of which are new entries to the previous edition.)

PB80-811458 PC **N01**/MF **N01**
National Technical Information Srvice, Springfield, VA.
Wind Power. 1979-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1979-May 80,
Audrey S. Hundemann. Jun 80, 145p
Supersedes NTIS/PS-79/0534 and NTIS/PS-78/0416.

The feasibility, use, and engineering aspects of wind power and windmills are discussed in these citations of Federally-funded research reports. Abstracts primarily cover the use of wind power for electric power generation and wind turbine design and performance. General studies dealing with comparative analyses of wind power and alternative energy sources are included, as are energy storage devices which can be used in these systems. (This updated bibliography contains 135 abstracts, 112 of which are new entries to the previous edition.)

PB80-928207 PC **E03**/MF **A01**
Central Intelligence Agency, Washington, DC.
Electric Power for China's Modernization: The Hydroelectric Option.
Research paper.
May 80, 40p ER-80-10089U
Color illustrations reproduced in black and white. Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-928200.

Shortages of electric power probably will restrain the development of China's economy throughout the 1980s. Such shortages have been a major factor in the recent slowdown of economic growth and probably will prolong the current period of economic readjustment. To help meet future power needs, the Chinese are seriously considering a massive program to construct hydroelectric power stations. China has the world's largest hydroelectric resources. Although the bulk of these resources is located in remote areas of west and southwest China, an estimated 145,000 to 220,000 MW of exploitable hydroelectric capacity can be transmitted to major industrial centers using China's existing technology. This is about three to five times China's total installed capacity (thermal and hydro) at yearend 1979. The success of China's hydroelectric program depends on a number of factors. Political stability over the next five- to 10-year period is essential a return to the internal instability and confused economic planning of the past would be disastrous. An adequate source of financing also is crucial to the success of the program. The electric power industry, moreover, will have to be given priority over most other

industrial sectors for domestic capital and for access to long-term foreign loans.

RFP-3000 PC **A02**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
New Developments in Wind Systems Technology.
R. L. Moment. 1979, 22p CONF-791204-20
Contract EY-76-C-04-3533
Miami international conference on alternative energy sources, Miami Beach, FL, USA, 10 Dec 1979.

Development programs for US wind turbines of under 100 kW output are reviewed. (ERA citation 05:015647)

SERI/PR-354-420 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Environmental Assessment of Small Wind Systems. Progress Report.
K. Lawrence, C. Strojan, and D. O'Donnell. Feb 80, 37p
Contract EG-77-C-01-4042

This progress report is the first formal product of the Environmental Assessment of Small Wind Energy Conversion Systems (SWECS) study. It presents an overview of the study's structure, planned activities, and a synopsis of task progress to date. This report was prepared as part of Task No. 5322 in the Institutional and Environmental Assessment Branch of the Solar Energy Research Institute. (ERA citation 05:015640)

10C. Energy Storage

AD-A083 690/8 PC **A04**/MF **A01**
Defence Research Establishment Ottawa (Ontario)
Investigation of Cadmium Selenide Photoelectrochemical Cells.
Technical note,
Robert A. Sawchuk, and David R. Snelling. Jan 80, 69p Rept no. DREO-TN-80-4

Three photoelectrochemical devices, developed at Simon Fraser University, employing electrochemically deposited cadmium selenide photoanodes, a polysulphide redox electrolyte and an in situ energy storage compartment were evaluated at DREO. The photoelectrochemical devices were initially tested using tungsten filament lamps, and the evaluation was completed with a xenon lamp which closely matched a solar spectrum corresponding to AM1 (air mass 1) conditions having an irradiance level of 2/889 Wm. Maximum power output of the devices was in the 10-20 mW range resulting in a solar (AM1) to electrical conversion efficiency of less than 1%. A fill-factor approaching 0.25 was typical for the photoelectrochemical cells examined. Counter electrode polarization and electrolyte light absorption were identified and evaluated as efficiency limiting factors. Proposed loss mechanisms are: series resistance in the semiconductor bulk, electron tunneling to surface states, current carrier losses at electron-hole recombination centers, and shorting to the nickel substrate. The concept of in situ energy storage was not successfully demonstrated. It is concluded that counter electrode polarization can be overcome and that further research is required in order to detect the presence of surface states and electron-hole recombination centers as well as research oriented to characterize the structure of the depletion layer and the CdSe/electrolyte interface. The efficiency of the electrochemically deposited CdSe should approach the 5-10% efficiency observed for single crystal and pressure sintered CdSe. (Author)

AD-A083 914/2 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Current Interruption in Inductive Storage Systems with Inertial Current Source.
Memorandum rept.,
I. M. Vitkovitsky, D. Conte, R. D. Ford, and W. H. Lupton. 5 Mar 80, 23p Rept no. NRL-MR-4168

Utilization of inertial current source inductive storage with high power output requires a switch with short opening time. This switch must operate as a circuit breaker, i.e., be capable to carry the current for a time period characteristic of inertial systems, such as homopolar generators. For reasonable efficiency, its opening time must be fast to minimize the energy dissipated in downstream fuse stages required for any additional pulse compression. A switch that satisfies these criteria, as well as other requirements such as that for high voltage operation associated with high power output, is an explosively driven switch consisting of large number of gaps arranged in series. The performance of this switch in limiting and/or interrupting currents produced by large generators has been studied. Single switch modules were designed and tested for limiting the commutating current output of 1 MW, 60 Hz, generator and 500 KJ capacitor banks. Current limiting and commutation were evaluated, using these sources, for currents ranging up to 0.4 MA. The explosive opening of the switch was found to provide an effective first stage for further pulse compression. It opens in tens of microseconds, commutates current at high efficiency (> 90%) and recovers very rapidly over a wide range of operating conditions. (Author)

AD-A083 941/5 PC **A02**/MF **A01**
Oregon State Univ Corvallis School of Oceanography
Exposure. A Newsletter for Ocean Technologists. Volume 8, Number 1,
Rod Mesecar. Mar 80, 8p

Dramatic progress has been made in the development of high performance batteries in recent years. Much of this development effort has concentrated on lithium-based batteries. The reason for the interest in lithium is that it has the highest potential of the metals in the electromotive series. Consequently, the theoretical energy density of lithium-based electrochemical couples is higher than other couples. As a result of research and development efforts carried out in industry and in government laboratories, the potential benefits of lithium-based batteries are now being realized in practical hardware. Lithium-sulfur and lithium-halogen couples are being developed for secondary (rechargeable) battery applications and lithium-thionyl chloride, lithium-sulfur dioxide, and lithium-vanadium pentoxide are the better known couples being developed for primary (nonrechargeable) battery applications. Comparisons of two representative examples of lithium battery electrochemistry, namely lithium sulfur dioxide (LiSO2) and lithium thionyl chloride (LiSOCl2) are made with other primary battery power sources.

COO-10387-01 MF **A01**
Rensselaer Polytechnic Inst., Troy, NY. Dept. of Chemistry.
Thermophysical Properties of Inorganic Polysulfides. Technical Progress Report.
G. J. Janz. Dec 79, 25p
Contract AC02-79ER10387
Microfiche copies only.

The present project was initiated May 15, 1979, and was undertaken to meet the data needs for thermophysical properties of selected polysulfides, as required directly or indirectly in the advanced battery development programs, and to advance the theoretical studies on the mechanisms of melting of ionic compounds. The research approach is briefly summarized and the accomplishments and status of the three principal tasks that have been undertaken in this initial period are reported: preparative chemistry; the MSDC-RPI DSC facility; and thermophysical properties measurements. First results for sodium trisulfide for the melting point, the enthalpy of fusion, and entrophy of fusion are 238.7 exp 0 C, 5538 cal/mol, and 10.83 cal/deg mol. 1 figure, 6 tables. (ERA citation 05:016224)

IKE-5-209 MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme.
Latent Heat Thermal Energy Storage in the Temperature Range 20 to 80 exp 0 C.
A. Abhat. Sep 78, 44p
U.S. Sales Only. Microfiche copies only.

After some introductory remarks on the necessity of heat storage - in particular for solar systems and the desired characteristics of a store, the latent heat energy (LTES) store is described as an example. The first chapter discusses the physical fundamentals of LTES (theory of crystallization, phase diagrams, nucleation, technological problem). The second chapter deals with suitable materials, their melting and solidification characteristics, typical heat-up and cooling-down curves, and thermal cycling. The third chapter reports on heat exchangers and their effects on the functioning of the whole system and also discusses experimental results. The appendix contains a comparison between thermal energy storage in water or rocks and latent heat thermal energy storage. (ERA citation 05:013635)

N80-22777/0 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Advanced Screening of Electrode Couples.
J. Giner, and K. Cahill. Feb 80, 56p NASA-CR-159738, DOE/NASA/0794-80/1
Contracts NAS3-20794, EC-77-A-31-1002

The chromium (Cr(3+)/Cr(2+)) redox couple (electrolyte and electrode) was investigated to determine its suitability as negative electrode for the iron (Fe(3+)/Fe(2+))-chromium (Cr(3+)/Cr(2+)) redox flow battery. Literature search and laboratory investigation established that the solubility and stability of aqueous acidic solutions of chromium(3) chloride and chromium(2) chloride are sufficient for redox battery application. Four categories of electrode materials were tested; namely, metals and metalloid materials (elements and compounds), alloys, plated materials, and Teflon-bonded materials. In all, the relative performance of 26 candidate electrode materials was evaluated on the basis of slow scan rate linear sweep voltammetry in stirred solution. No single material tested gave both acceptable anodic an acceptable cathodic performance. However, the identification of lead as a good cathodic electrocatalyst and gold as a good anodic electrocatalyst led to the invention of the lead/gold combination electrocatalyst. This type of catalyst can be fabricated in several ways and appears to offer the advantages of each metal without the disadvantages associated with their use as single materials. This lead/gold electrocatalyst was tested by NASA-Lewis Research Center in complete, flowing, redox batteries comprising a stack of several cells. A large improvement in the battery's coulombic and energy efficiency was observed.

N80-22788/7 PC **A99**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Thermal Energy Storage: Fourth Annual Review Meeting.
Mar 80, 650p NASA-CP-2125, E-428
Meeting Held at Tysons Corner, VA., 3-4 Dec. 1979; Sponsored by Doe.

No abstract available.

N80-22858/8 PC **A04**/MF **A01**
Varta Batterie A.G., Kelkheim (Germany, F.R.). Forschungs- und Entwicklungszentrum.
Galvanic Cells with Doped CaF2 as a Solid Electrolyte.
Final Report.
M. Koriath, and R. Braeutigam. Jun 79, 67p
BMFT-FB-T-79-03
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. Und Technol.

Galvanic cells of the type Ca/CaF2/CuF2 were developed by first producing discharged cells with a thin film technique and later charging them. This method led to cells which showed a very high rate of self discharge. Since cells of this type cannot easily be manufactured in their charged state, it is recommended that further development efforts be discontinued.

11. MATERIALS

11A. Adhesives and Seals

AD-A083 892/0 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
The Adhesive Composition for Plastics.
28 Mar 80, 4p Rept no. FTD-ID(RS)T-0198-80
Edited trans. of Revista de Chimie (Romania) v27 n5 p432 May 76, by Mina Winters.

No abstract available.

AD-A083 933/2 PC **A10**/MF **A01**
New Mexico Univ Albuquerque Dept of Mechanical Engineering
The Wavy Mechanical Face Seal - Theoretical and Experimental Results.
Summary rept. 1 Dec 78-30 Nov 79,
A. O. Lebeck, and L. A. Young. Jan 80, 224p
Rept no. ME-105(80)ONR-414-1
Contract N00014-76-C-0071

In this report the results of theoretical and experimental investigations on the effects of waviness on mechanical face seal performance are presented. In previous work it was shown how waviness imposed on a seal face leads to reduced friction and wear while creating only a small leakage in a water seal. It was also shown that the waviness must be moved slowly around the seal ring in order that the effect of waviness remain indefinitely. A test apparatus for measuring the effects of waviness is described. A computer based system is used to record the data and monitor the test. A test procedure is outlined. Results from wavy seal experiments show that waviness reduces seal wear compared to a flat face seal a factor of four to forty and reduces torque a factor of four. Long term tests show that by moving the wave the effect remains indefinitely. As the amount of waviness is increased, friction torque decreases and leakage increases. Wear profiles show that the seal faces have a tilt in addition to waviness. This alters the pressure distribution significantly when compared to the radially parallel wavy faces analyzed previously. Tests using a converging radially tapered seal show that the taper wears away with time.

N80-22325/8 PC **A05**/MF **A01**
Solar Turbines International, San Diego, CA.
Advanced Ceramic Material for High Temperature Turbine Tip Seals.
Final Report, Feb. 1976 - May 1979.
J. W. Vogan, N. G. Solomon, and A. R. Stetson.
Jan 80, 97p NASA-CR-159774, SR79-R-4482-43
Contract NAS3-20081

Forty-one material systems were evaluated for potential use in turbine blade tip seal applications at 1370 C. Both ceramic blade tip inserts and abradable ceramic tip shoes were tested. Hot gas erosion, impact resistance, thermal stability, and dynamic rub performance were the criteria used in rating the various materials. Silicon carbide and silicon nitride were used, both as blade tips and abradables. The blade tip inserts were fabricated by hot pressing while low density and honeycomb abradables were sintered or reaction bonded.

N80-22701/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Dynamic Response to Rotating-Seat Runout in Non-Contacting Face Seals.
I. Etsion. Apr 80, 25p NASA-TM-81490, E-392

The dynamic response of a flexibly mounted ring to runout of the rotating seat in mechanical face seals is analyzed assuming small perturbations. It is found that tracking ability of the stator depends only on its dynamic characteristics and operating conditions and is not affected by the amount of runout. Three different modes of dynamic response are shown and the condition for parallel tracking is presented.

PB80-178825 Not available NTIS
National Bureau of Standards, Washington, DC.
Adhesive Bonding of Various Materials to Hard Tooth Tissues. XX. Calcium-to-Calcium Distances in Hydroxyapatite.
Final rept.,
L. W. Schroeder, R. L. Bowen, and J. S. Ferris. 1980, 8p
Grants PHS-DE-00572, PHS-DE-02494-10
See also report dated Mar 79, PB-295 590.
Pub. in Jnl. Biomed. Mater. Res. 14, p83-90 1980.

Distributions of Ca-to-Ca distances have been obtained from the crystal structure of hydroxyapatite for all biologically significant planes. Most frequently, calcium ions are separated by about 4, 6.3, 7.9, and 9.0 to 9.6 A. Frequent occurrence of distances at 10.4, 11.8 and 12.6 A result from a Ca ion in one repeating unit being paired with a Ca in another unit cell.

11B. Ceramics, Refractories, and Glasses

AD-A083 859/9 PC **A04**/MF **A01**
Army Military Personnel Center Alexandria VA
Microstructural Changes in Neutron and Ion Irradiated Silicon Carbide.
Final rept.,
Steven D. Harrison. 28 Apr 80, 51p
Master's thesis.

Reaction bonded silicon carbide (Norton NC 430) was examined with a 100 KV JEOL 100S TEM and a 1200 KV AEI EM7 MK II HVEM for microstructural changes induced by irradiation. Three irradiation modes were used: (1) 2 x 10 to the 24th power neutrons/m square (E > 1 MeV) irradiated at 150 degrees C; not annealed. (2) 4 x 10 to the 24th power neutrons/m square (E > 1 MeV) irradiated at 1100 degrees C. (3) 1 and 2 dpa from 4 MeV Ar(40) ions at < 60 degrees C; not annealed. In mode 1, the dislocation density increased by six orders of magnitude to 10 to the 14th power/cu m. Dense dislocation tangles were observed adjacent to grain boundaries and voids. No radiation-induce d voids and few black spot defects were observed. In mode 2, the dislocation density was 10 to the 13th power m/cu m nut numerous unresolved black spot defects were visible. The individual black spots are Frank dislocation loops with a diameter less than 2 nm. The density of the black spots approach 5 x 10 to the 20th power cm. The argon ion damaged samples showed an unexpected loss of long range order. Neutron damage simulation with heavy ions appears to be rate dependent and may not be suitable for the investigation of ceramic materials. It can be argued that radiation damage in silicon carbide saturates when the vacancy concentration increases sufficiently to allow recombination of interstitials at sites removed from Frank interstitial dislocation tangles. This is evident microstructurally by the high density and small size of the black spots at elevated temperature and fluence. Calculations indicate that neutrons in energy transfers are the driving force in the production of dislocations in the SiC lattice.

SGAE-3025 MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Investigations to the Glass Corrosions. Review About the Behaviour of the Na- and K-Glasses.
G. Nauer. Feb 79, 84p ST-86/79
In German.
U.S. Sales Only. Microfiche copies only.

Since the corrosion of glasses is the dominant factor for their long term stability it was in the present paper tried to summarize the known literature about glas corrosion to gain information of the behaviour of technical and antique kinds of glasses. (Atomindex citation 10:479325)

11C. Coating, Colorants, and Finishes

N80-22349/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Effect of Thermal Cycling on ZrO2-Y2O3 Thermal Barrier Coatings.
G. Mcdonald, and R. C. Hendricks. 1980, 10p
NASA-TM-81480, E-416
Presented at the Intern. Conf. On Met. Coatings, San Diego, Calif., 21-25 Apr. 1980; Sponsored by the AM. Vacuum Soc.

A study was made of the comparative life of plasma sprayed ZrO2-Y2O3 thermal barrier coatings on NiCrAlY bond coats on Rene 41 in short (4 min) and long (57 min) thermal cycles to 1040 C in a 0.3 Mach flame. Short cycles greatly reduced the life of the ceramic coating in terms of time at temperature as compared to longer cycles. Appearance of the failed coating indicated compressive failure. Failure occurred at the bond coat-ceramic coat junction. At heating rates greater than 550 kw/sq m, the calculated coating detachment stress was in the range of literature values of coating adhesive/cohesive strength. Methods are discussed for decreasing the effect of high heating rate by avoiding compressive stress.

N80-22405/8 PC **A02**/MF **A01**
Fiat Research Center, Orbassano (Italy).
An Approach to the Correlation Between the Degree of Crosslinking of Organic Coatings and Their Technological Properties.
A. Martina, C. Folonari, and P. Bianco. 1979, 21p
Presented at Eurocoatings 79-European Conf. On Paints and Coatings, Rome, 25-26 Jun. 1979.

The dependence of some mechanical and chemical/physical properties upon time and temperature variables in the process of curing leading to paint hardening is studied. The quantitative characterization of polymer crosslinking applied to whole paints is discussed. Experiments which determine the degree of crosslinking for a filler used in automobile production by noting the amount of swelling in the solvent, the permeability to water vapor, the tensile strength, and the elongation are described.

N80-22464/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Effects of Yttrium, Aluminum and Chromium Concentrations in Bond Coatings on the Performance of Zirconia-Yttria Thermal Barriers.
S. Stecura. 1980, 12p NASA-TM-81485, E-423
Presented at Intern. Conf. On Metallurgical Coatings, San Diego, Calif., 21-25 Apr. 1980.

A cyclic furnace study was conducted on thermal barrier systems to evaluate the effects of yttrium, chromium, and aluminum in nickel-base alloy bond coatings and the effect of bond coating thickness on yttria-stabilized zirconia thermal barrier coating life. Without yttrium in the bond coatings, the zirconia coatings failed very rapidly. Increasing chromium and aluminum in the Ni-Cr-Al-Y bond coatings increased total coating life. This effect was not as great as that due to yttrium. Increased bond coat thickness was also found to increase life.

RTI-1708/00-02SA PC **A06**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Non-Glass Glazings. Semiannual Report, April 1-September 29, 1979.
Sep 79, 112p
Contract EM-78-C-04-5304

Work on both the accelerated field weathering and laboratory weathering is on schedule. Samples were returned from DSET with 500,000 langleys exposure. A sample of silicone resin with Teflon reinforcement has been fabricated, along with monomethyl laminates. Measurements of solar transmittance have been refined with the aid of a spectrophotometer equipped with an integrating sphere covering the visible range of the solar spectrum. A comparative study of variations of ASTM E424-71 Method B using a pyranometer and different sized and colored enclosures and the various silicone materials under investigation has been completed. The first phase of the economic study has been completed and examines the cost of silicone glazings, relative to glass, assuming comparable performance. Additional basic studies, which include characterization of the mechanism of crosslink formation in silicone polymers exposed to ultraviolet radiation, have been completed. These studies involved Fourier transform infrared spectroscopy, ultraviolet spectroscopy, exposure to selective chemical crosslinking agents, and calculations of quantum yields for specifically characterized polydimethylsiloxanes. In addition, the effects of oxygen and water on the rate of crosslinking under ultraviolet radiation were determined. (ERA citation 05:015437)

11D. Composite Materials

AD-A083 715/3 PC **A04**/MF **A01**
Lockheed Palo Alto Research Labs CA
Strength Retention and Corrosion Resistance of Graphite/Epoxy-Aluminum Honeycomb Sandwiches in Salt Spray and High Humidity Environments.
R. E. Mauri, and M. Duggan. 28 Aug 73, 51p
Rept no. LMSC/D354108

Honeycomb sandwich panels of various types fabricated of aluminum and graphite/epoxy compos-

ite facings bonded to aluminum and phenolic fiberglass (HRD) cores were subjected to 30-day accelerated aging exposures to high humidity (95% RH) and salt spray environments. Sandwiches were tested for flatwise tensile and flexural strength before and after environmental aging. In addition, weight loss determinations and visual examination of corrosion effects were performed. Severe galvanic corrosion was found on graphite/epoxy-aluminum core sandwiches during and after the salt spray exposure, and mechanical strength retention was drastically reduced. Those sandwiches made of graphite/epoxy-aluminum core incorporating a 5-mil-thick glass fabric interliner in the core-to-face bonds (between the facings and the modified epoxy adhesive) withstood salt spray exposure extremely well, i.e., no evidence of galvanic corrosion or significant reduction of mechanical strength properties occurred. None of the sandwich types tested were affected by the 30-day 95% relative humidity exposure at 120 degrees F. (Author)

AD-A083 721/1 PC **A05**/MF **A01**
Texas A and M Univ College Station Mechanics and Materials Research Center
Composite Materials for Structural Design.
Annual technical rept. no. 2 15 Jan-31 Dec 79,
R. A. Schpey. Feb 80, 97p MM-3724-80-1,
AFOSR-TR-80-0307
Contract F49620-78-C-0034

Summarized are research activities related to polymer-matrix composite materials in the areas of processing and dynamic mechanical testing, physical aging, delamination fracture characterization, temperature and moisture effects, finite element modelling of nonlinear viscoelastic materials, and neutron radiography. Also included are Abstracts of five M.S. theses and six papers describing several recently completed experimental and analytical research investigations of factors which pertain to processing, testing, and design of composite structures. (Author)

AD-A083 726/0 PC **A04**/MF **A01**
Pennsylvania State Univ University Park Materials Research Lab
Composite Pyroelectric Materials.
Final technical rept. 1 Jul 78-30 Sep 79,
R. E. Newnham, and A. S. Bhalla. 30 Jun 79, 53p
Contract N00014-78-C-0291
Sponsored in part by Grant ARPA Order-3617.

Pyroelectric materials develop electric charge with temperature change. They are used in thermal device applications such as surveillance, burglar alarms and vidicon night-image systems. Greater pyroelectric sensitivity is needed for many vidicon applications. We are exploring ways of increasing the pyroelectric figure-of-merit (pyroelectric coefficient/permittivity) through the use of composite materials. In this report we discuss the results of work carried out at Penn State and at the North American Philips Laboratory (Dr. J. Dougherty and Dr. W. Smith). The design principles and experimental data for a model system are described in the section entitled Pyroelectric PZT composites. For PZT-Spurrs composites with parallel connectivity, the pyroelectric figure-of-merit is more than five times larger than for a poled PZT ceramic.

AD-A083 795/5 PC **A02**/MF **A01**
Northwestern Univ Evanston IL Dept of Materials Science
Residual Stress Measurements on Aluminum-Graphite Composites Using X-Ray Diffraction Techniques.
Technical rept.,
Swe-Den Tsai, Deepak Mahulikar, H. L. Marcus, Ismail C. Noyan, and Jerome B. Cohen. 8 Apr 80, 15p Rept no. TR-26
Contract N00014-75-C-0580
Prepared in cooperation with Texas Univ. at Austin.

Metal Matrix Composites (MMCs) have generated considerable interest in the materials field, because of their potential applications in dynamic structures. A MMC with its excellent mechanical as well as physical properties carries a distinct advantage over other composite systems, particulary at high temperatures. At the same time a MMC system is characterized by heterogeneity, anisotropy and interfaces which affect those properties considerably. Interfaces have been known to influence the properties of MMCs significantly and their importance has been discussed extensively. However, the interface chemistry and its exact role in alteration of various properties is not well-known yet. One of the important things needed for better understanding of the interface is its stress state. Thermal and mechanical treatments involved in the fabrication of composite materials, give rise to triaxial residual stresses. Speculations are that these stresses, originating from the differing thermal coefficients of the reinforcement and the matrix, play an important part in the transverse properties of the MMCs.

AD-A083 974/6 PC **A02**/MF **A01**
Oklahoma Univ Norman School of Aerospace Mechanical and Nuclear Engineering
Cylindrical Shells of Bimodulus Composite Material.
Technical rept.,
Charles W. Bert, and V. Sudhakar Reddy. Feb 80, 25p Rept nos. OU-AMNE-80-3, TR-12
Contract N00014-78-C-0647

Certain fiber-reinforced materials, especially those with slightly curved fibers in very soft matrices, exhibit considerably smaller stiffnesses when loaded in compression than when loaded in tension. Examples are tire cord-rubber, wire-reinforced solid propellants, and certain soft biological tissues. For purposes of analysis and design, such materials can be modeled as a bimodulus material, i.e., one having one set of stiffnesses when the fiber-direction strain is tensile and another set when this strain is compressive. Using the fiber-governed bimodulus-material model introduced several years ago by the senior author and verified for cord-rubber composites, the present authors extend their previous work on the deflection of single-layer and cross-ply laminated rectangular plates to circular cylindrical shells of the same construction. A closed-form solution is presented for a thin, freely supported, cylindrically curved panel under sinusoidally distributed loading. Numerical results are presented to show the effect of shell curvature on the neutral-surface positions and deflection. (Author)

AD-A084 069/4 PC **A02**/MF **A01**
Oklahoma Univ Norman School of Aerospace Mechanical and Nuclear Engineering
Vibration of Composite Structures.
Technical rept.,
Charles W. Bert. Mar 80, 24p Rept nos. OU-AMNE-80-6, TR-13
Contract N00014-78-C-0647

The purpose of this paper is to review some of the recent contributions to the field of vibration of composite structures. The topics of fatigue and fracture, while quite important in the overall dynamic performance of composite structures, are not considered in this survey. The survey treats these topics: dynamic stiffness and damping of composite materials, beams and curved bars and rings, flat panels, and cylindrically curved panels and shells. It concludes with some suggestions for future research. It is well established that fiber-reinforced composite materials, by virtue of the geometry of the fibers acting stiffeners, behave macroscopically like homogeneous but anisotropic materials. The class of elastic symmetry depends upon the geometric arrangement of the fibers.

AD-A084 070/2 PC **A03**/MF **A01**
Oklahoma Univ Norman School of Aerospace Mechanical and Nuclear Engineering
Large Deflection and Large-Amplitude Free Vibrations of Laminated Composite-Material Plates.
Technical rept.,
J. N. Reddy, and W. C. Chao. Apr 80, 28p Rept nos. OU-AMNE-80-7, TR-14
Contract N00014-78-C-0647

Finite-element analysis of the large-deflection theory (in von Karman's sense), including transverse shear, governing moderately thick, laminated anisotropic composite plates is presented. Linear and quadratic rectangular elements with five degrees of freedom (three displacements, and two shear rotations) per node are employed to analyze rectangular plates subjected to various loadings and edge conditions. Numerical results for bending deflections, stresses, and natural frequencies are presented showing the parametric effects of plate aspect ratio, side-to-thickness ratio, orientation of layers, and anisotropy. (Author)

N80-22406/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Langley Station, VA.
Effects of Method of Loading and Specimen Configuration on Compressive Strength of Graphite/Epoxy Composite Materials.
R. K. Clark, and W. B. Lisagor. Apr 80, 44p
NASA-TM-81796

Three test schemes were examined for testing graphite/epoxy (Narmco T300/5208) composite material specimens to failure in compression, including an adaptation of the IITRI 'wedge grip' compression fixture, a face-supported-compression fixture, and an end-loaded-coupon fixture. The effects of specimen size, specimen support arrangement and method of load transfer on compressive behavior of graphite/epoxy were investigated. Compressive stress strain, strength, and modulus data obtained with the three fixtures are presented with evaluations showing the effects of all test parameters, including fiber orientation. The IITRI fixture has the potential to provide good stress/strain data to failure for unidirectional and quasi-isotropic laminates. The face supported fixture was found to be the most desirable for testing + or - 45 s laminates.

N80-22407/4 PC **A04**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Silicone Modified Resins for Graphite Fiber Laminates.
Final Report.
L. W. Frost, and G. M. Bower. 28 Sep 79, 75p
NASA-CR-159750, FR-79-9B7-SICOP-R1
Contract NAS3-21373

The development of silicon modified resins for graphite fiber laminates which will prevent the dispersal of graphite fibers when the composites are burned is discussed. Eighty-five silicone modified resins were synthesized and evaluated including unsaturated polyesters, thermosetting methacrylates, epoxies, polyimides, and phenolics. Neat resins were judged in terms of Si content, homogeneity, hardness, Char formation, and thermal stability. Char formation was estimated by thermogravimetry to 1,000 C in air and in N2. Thermal stability was evaluated by isothermal weight loss measurements for 200 hrs in air at three temperatures. Four silicone modified epoxies were selected for evaluation in unidirectional filament wound graphite laminates. Neat samples of these resins had 1,000 C char residues of 25 to 50%. The highest flexural values measured for the laminates were a strength of 140 kpsi and a modulus of 10 Mpsi. The highest interlaminar shear strength was 5.3 kpsi.

N80-22411/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Testing of Containers Made of Glass-Fiber Reinforced Plastic with the Aid of Acoustic Emission Analysis.
K. Wolitz, W. Brockmann, and T. Fischer. Nov 79, 11p NASA-TM-75737
Contract NASW-3198
Transl. into English from Neure Entwicklungen und Besondere Veriahren der Zfp (Berlin), V. 3, 1978 p 789-795. Translation Was Announced as A7930328. Transl. By Scientific Translation Service, Santa Barbar, Calif. Proceedings of the First European Conf. On Non-Destructive Testing, Mainz, West Germany, 24-26 Apr. 1978.

Acoustic emission analysis as a quasi-nondestructive test method makes it possible to differentiate clearly, in judging the total behavior of fiber-reinforced plastic composites, between critical failure modes (in the case of unidirectional composites fiber fractures) and non-critical failure modes (delamination processes or matrix fractures). A particular advantage is that, for varying pressure demands on the composites, the emitted acoustic pulses can be analyzed with regard to their amplitude distribution. In addition, definite indications as to how the damages occurred can be obtained from the time curves of the emitted acoustic pulses

as well as from the particular frequency spectrum. Distinct analogies can be drawn between the various analytical methods with respect to whether the failure modes can be classified as critical or non-critical.

N80-22412/4 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Economical Processing of Fiber-Reinforced Components with Thermal Expansion Molding.
K Schneider. Dec 79, 34p NASA-TM-75738, PAPER-79-011
Contract NASW-3198
Transl. Into English of Conf. Paper-79-011 from Dglr. Original Language Document Was Announced as A79-32307. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Presented at the Symp. Uber Wirtschaftliche Herstelltechniken, Cologne, 28 Mar. 1979.

The concept of economical fabrication of fiber-reinforced structural components is illustrated with an example of a typical control surface (aileron). The concept provides for fabricating struts, ribs, and a cover plate as an integral structure in a hardening device and then joining the closure cover plate mechanically. Fabrication of the integral structure is achieved by the 'thermal expansion molding' technique. The hardening pressure is produced by silicone rubber cores which expand under the influence of temperature. Test results are presented for several rubber materials as well as for various structural pieces. The technique is demonstrated extensively for an aileron, consisting of five ribs, struts, and a cover plate. Economically, for a large scale technical production of an aileron, cost savings of twenty-five percent can be realized compared to those for a sheet metal structure.

N80-22413/2 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Acoustic Emission from Composite Materials.
I. C. Visconti, and R. Teti. Mar 79, 31p NASA-TM-75740
Contract NASW-3199
Transl. Into English of Conf. Paper "Emissioni Acustiche Dai Materiali Compositi", 1978 34 p. Original Language Document Was Announced as A79-24063. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Napoli Univ. Presented at the 3D Asmeccan. And Assoc. Meridionale di Meccan., Milan, 11-13 May 1978.

The two basic areas where the acoustic emission (AE) technique can be applied are materials research and the evaluation of structural reliability. This experimental method leads to a better understanding of fracture mechanisms and is an NDT technique particularly well suited for the study of propagating cracks. Experiments are described in which acoustic emissions were unambiguously correlated with microstructural fracture mechanisms. The advantages and limitations of the AE technique are noted.

N80-22414/0 PC **A04**/MF **A01**
Aeronautical Research Inst. of Sweden, Stockholm. Structures Dept.
Experience from the Use of the Transient Moisture Response Computer Program W8gain for Composite Materials.
C. Y. Lundemo. Sep 79, 69p FFA-HU-2043
Contract FMV-F-K-82223-77-001-21-001

A computer program for transient moisture response of composite materials and the required input data are discussed. Some numerical results are presented and compared with experiments performed on graphite/epoxy T300/5208. The numerical results indicate that the weight-gain due to moisture could be well predicted when the input data are properly measured. There are large spreads in data presented in the literature between different investigations, probably due to different curing processes for the same material. It is suggested that the input data to a moisture response calculation must be measured in order to accurately predict the transient moisture response.

PB80-180540 PC **A07**/MF **A01**
Virginia Polytechnic Inst., and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
Nonlinear Temperature Dependent Failure Analysis of Finite Width Composite Laminates.
Final rept.,
Aniruddha P. Nagarkar, and Carl T. Herakovich.
Dec 79, 130p VPI-E-79-36
Grant NGR-1250

A quasi-three dimensional, nonlinear elastic finite element stress analysis of finite width composite laminates including curing stresses is presented. Cross-ply, angle-ply, and two quasi-isotropic graphite/epoxy laminates are studied. Curing stresses are calculated using temperature dependent elastic properties that are input as percent retention curves, and stresses due to mechanical loading in the form of an axial strain are calculated using tangent modulii obtained by Ramberg-Osgood parameters. It is shown that curing stresses and stresses due to tensile loading are significant as edge effects in all types of laminate studies. The tensor polynomial failure criterion is used to predict the initiation of failure. The mode of failure is predicted by examining individual stress contributions to the tensor polynomial. Failure is predicted to always initiate at the free edge, but not always at ply interfaces. The location and mode of failure is shown to be laminate dependent.

11E. Fibers and Textiles

PB80-178031 Not available NTIS
National Bureau of Standards, Washington, DC.
Mossbauer Spectroscopy of Polycrystalline Steel Fibers.
Final rept.,
D. S. Lashmore, L. J. Swartzendruber, and L. H. Bennett. 1 Jan 80, 2p
Pub. in Journal of Applied Physics Letter 36 n1 p39-40, 1 Jan 80.

Polycrystalline steel fibers, commonly known as 'Schladitz whiskers,' produced by thermal decomposition of iron pentacarbonyl in the presence of a magnetic field, have been studied by means of the Fe 57 Mossbauer effect. Results show that the fibers are a two-phase alloy of alpha-Fe and Fe3C. Almost all the carbon present in the fibers is tied up as Fe3C. The magnetic polarization (in zero applied field) is random rather than being aligned along the fiber axis.

11F. Metallurgy and Metallography

AD-A083 643/7 PC **A04**/MF **A01**
Georgia Inst of Tech Atlanta Fracture and Fatigue Research Lab
The Effect of Ion Plating and Ion Implantation on the Cyclic Response and Fatigue Crack Initiation of Metals and Alloys.
Technical rept. no. 2 1 Mar 79-29 Feb 80,
S. B. Chakrabortty, S. Spooner, and Edgar A. Starke, Jr. 9 Apr 80, 59p
Contract N00014-78-C-0270

Fatigue crack initiation can be affected by surface phenomena and the possibility exists for improving the fatigue performance by altering the state of the surface without greatly changing bulk properties. This program was initiated on 1 March 1978, with the objective of determining the effect of ion implantation and ion plating on the cyclic stress-strain response and fatigue crack nucleation of a metal substrate. To meet this objective, we have selected surface film-substrate combinations designed to separate the various parameters, e.g., crystal structure, SFE, shear modulus, misfit, residual stress, etc., which control near surface deformation and associated crack initiation. This report summarizes our progress during the period 1 March 1979 - 29 February 1980. Three aspects of the program are discussed: (1) The effect of silver and nickel ion plating on the low and high cycle fatigue behavior of polycrystalline copper, (2) x-ray diffraction analysis of ion implanted crystals, and (3) the effect of aluminum-ion implantation on the fatigue crack initiation of polycrystalline copper. (Author)

AD-A083 649/4 PC **A02**/MF **A01**
Pennsylvania Univ Philadelphia
Electronic Effects of Sulfur in Nickel: A Model for Grain Boundary Embrittlement.
Technical rept.,
C. L. Briant, and R. P. Messmer. 10 Apr 80, 19p Rept no. TR-1
Contract N00014-79-C-0991
Prepared in cooperation with General Electric Corporate Research and Development, Schenectady, NY.

This paper reports the first study employing detailed electronic structure calculations to investigate a model of grain boundary embrittlement. The results show that adding sulfur to a cluster of nickel atoms causes strong bonds to be formed between the sulfur atom and the nickel atoms nearest to it, while simultaneously weakening bonds between these nickel atoms and their neighboring nickel atoms in the cluster. As a consequence one can suggest that sulfur forms very strong bonds within the plane of the boundary but weakens metal-metal bonds perpendicular to this plane. Although, for the present, the results can be considered only as suggesting one possible embrittlement mechanism, they do demonstrate the insight which such calculations can provide into this very central question of grain boundary embrittlement. (Author)

AD-A083 743/5 PC **A02**/MF **A01**
Princeton Univ NJ
The Embrittlement of Alloys Under Impulse Thermal, Pressure and Chemical Conditions.
Final rept. 1 Dec 78-30 Nov 79,
A. Kahn. Apr 80, 8p ARO-16152.2-A-MS
Grant DAAG29-79-G-0038

During the past two years, we directed our metallurgical study of the embrittlement of bore surfaces toward the examination of the composition of large-calibre gun barrel surfaces via the combines SEM/SAM (Scanning Electron Microscope/Scanning Auger Microprobe) techniques. In this final report, we outline the principal results of this study. (Author)

AD-A083 768/2 PC **A04**/MF **A01**
Georgia Inst of Tech Atlanta Fracture and Fatigue Research Lab
The Effect of Microstructure on the Properties of High Strength Aluminum Alloys.
Annual rept. Feb 79-Feb 80,
Edgar A. Starke, Jr., and T. H. Sanders, Jr. Feb 80, 67p AFOSR-TR-80-0367
Grant AFOSR-78-3471

This program was initiated on 1 January 1978. During 1979, the effect of copper content on the FCP behavior of four Al-6Zn-2Mg-XCu-T7351 alloys was investigated in dry air and distilled water and compared with last year's study of the T651 condition. The peak-aged-treatment exhibited a lower growth rate in dry air over the range of delta K studied, and also displayed a higher threshold and resistance to fatigue cracking near the threshold in the distilled water environment.

BDX-613-2341 PC **A03**/MF **A01**
Bendix Corp., Kansas City, MO.
Thermal Fatigue Evaluation of Solder Alloys. Final Report.
D. M. Jarboe. Feb 80, 33p
Contract EY-76-C-04-0613

An evaluation was made of the relative thermal fatigue resistance of 29 solder alloys. A number of these alloys were found to be less susceptible to thermal fatigue cracking in encapsulated printed wiring board applications than the commonly used tin-lead eutectic (63Sn-37Pb). Three alloys, 95Sn-5Ag, 96.5Sn-3.5Ag, and 95Sn-5Sb offered the greatest resistance to thermal fatigue. The selection of the encapsulation materials was confirmed to be a significant factor in thermal fatigue of solder joints, regardless of the solder alloy used. (ERA citation 05:016121)

CEA-CONF-4482 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Technologie.
Radiation Induced Homogeneous Precipitation in Undersaturated Solid-Solutions.
R. Cauvin, and G. Martin. 1978, 26p CONF-781194-4
Workshop on solute segregation and phase stability during irradiation, Gatlinburg, TN, USA, 1 Nov 1978.

U.S. Sales Only.

The stability of various types of solid solutions under irradiation is studied. In this paper, observations made on AlZn solid solutions under 1 MeV electron irradiation are reported. Al-Zn was chosen as a prototype of solid solutions with a simple miscibility gap. It is shown that under appropriate irradiation conditions undersaturated AnZn solid solutions give rise to a homogeneous precipitation of coherent G.P. zones and of incoherent Zn precipitates the atomic volume of which is smaller than that of the matrix. We propose a more general treatment of solute concentration heterogeneities in solid solutions under irradiation and suggest how it might account for the nucleation of the observed phases. The growth of the observed precipitates is studied. (Atomindex citation 10:494105)

CEA-CONF-4510 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Grenoble (France). Dept. de Recherche Fondamentale.
Electron Irradiation Effects on Iron Nickel Invar.
A. Chamberod, J. Laugier, and J. M. Penisson. 1978, 20p CONF-7811157-1
Invar symposium, Nagoya, Japan, 4 Nov 1978.
U.S. Sales Only.

Electron irradiation is used as a means of accelerating the diffusion in FeNi alloys. Moessbauer effect, X-ray and electronic microscopy experiments on samples with 28 to 50% Ni show that the "Invar character" disappears after irradiation up to 250 exp 0 C: in particular the variation of the parameter versus temperature becomes linear around room temperature. At the same time, two phases appear obviously in the alloy, one rich in nickel and ordered with a FeNi (AuCu) superstructure, the other rich in iron and probably ordered (Fe sub 3 Ni). The invar state is therefore showed to be a metastable state. A diagram of the iron nickel alloy is proposed. (Atomindex citation 10:494106)

CEA-R-4958 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Technologie.
Irradiation Induced Precipitation: A Thermodynamical Approach.
J. L. Bocquet, and Georges Martin. Feb 79, 31p
In French.
U.S. Sales Only.

A binary alloy (A, B) under steady state irradiation is considered as a ternary alloy (A, B, defects) in constrained equilibrium (the constraint represented by the irradiation consists in maintaining a given supersaturation of point defects). All possible two-body interactions (attractive, repulsive) have been checked between the solvent A, the solute B, and the defects C. The conditions of an irradiation corresponds to a low point-defect concentration; the only cases of interest are those where such a low concentration makes new phases precipitate, which are richer in solute than the initial solid-solution. Radiation induced precipitation is expected to occur under the following necessary conditions: - when the binary alloy (A, B) shows ordering or is ideal, a necessary condition is that the binary solute-defects must show ordering. - when the binary alloy (A, B) shows clustering, a necessary condition is that the temperature must be close to the critical mixing temperature Tsub(AB)sup(D). The physical significance of these conditions is discussed. (Atomindex citation 10:494100)

COO-3084-74 PC **A04**/MF **A01**
Brown Univ., Providence, RI. Div. of Engineering.
Plastic Creep Flow Effects in the Diffusive Cavitation of Grain Boundaries.
A. Needleman, and J. R. Rice. Dec 79, 69p
Contract EY-76-S-02-3084

The growth of cavities along grain interfaces was analyzed by the combined processes of grain boundary diffusion and plastic dislocation creep in the adjoining grains. It is shown that the coupling between the processes can be expressed in terms of a parameter L, which has the dimensions of length and which is a function of material properties, temperature and applied stress; L decreases with increasing temperature and stress and has values in the range of 0.25 to 25 mu m for various pure metals when stressed to 10 exp -3 x shear modulus at 0.5 T/sub m/. The contribution of dislocation creep to the cavity growth rate is shown to be negligible when L is comparable to or larger than the cavity spacing, but significant interactions occur, leading to growth rates very much in excess of those predicted on the basis of boundary diffusion alone, when L is comparable to or smaller than the cavity size. The coupling occurs because extensive dislocation creep allows local accomodation of matter diffused into the grain boundary from the cavity walls. The cavity growth rate is analyzed by formulating a new variational principle that governs combined processes of grain boundary diffusion and non-linear viscous creep, and by implementing this principle through the finite-element method to obtain numerical solutions. Results for the cavity growth rate are presented for a wide range of ratios of L to cavity spacing, and of cavity radius to spacing. Also, results are presented for the total growth time of cavities from an initial size to final coalescence. (ERA citation 05:016130)

DOE/ER/01198-1299 MF **A01**
Illinois Univ. at Urbana-Champaign. Graduate Coll.
Anelastic Studies of Interstitially Trapped Hydrogen in Niobium.
P. E. Zapp. 1979, 139p
Contract AC02-76ER01198
Thesis.
Microfiche copies only.

The trapping and quantum mechanical motion of hydrogen were investigated in Nb-O-H and Nb-N-H by anelastic relaxation. The measured relaxations were caused by the local, stress induced reorientation of single H atoms bound to single, essentially immobile O and N atoms. The symmetries and binding enthalpies of O-H pairs were studied in oriented single crystals of high-purity Nb using pulse-echo attenuation of very-high frequency longitudinal stress waves between 100 and 300 exp 0 K. Well-defined internal friction peaks were found in the <100>, <110>, and <111> directions of the b.c.c. lattice. Temperature dependence of the jump frequency of H below 100 exp 0 K was studied in the Nb-N-H system using lower frequency methods. Internal friction peaks were measured, relaxation times were calculated from strain relaxation measurement below 60 exp 0 K. Data show marked deviation from classical thermally activated Arrhenius behavior. (ERA citation 05:016131)

Juel-1584 PC **A04**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorwerkstoffe und Heisse Zellen.
Investigations on the Determination of Corrosion Kinetics and the Structure of Corrosion Products on High-Temperature Alloys under Low Oxygen Partial Pressures.
Diss,
A. Poestges, A. Naoumidis, and H. Nickel. Apr 79, 66p
In German.
U.S. Sales Only.

On three nickel-base-alloys (NIMONIC 80A, INCONEL 617 and ALLOY 713LC), which are planned as materials for components of the primary cooling circuit of high-temperature reactors, studies for the determination of the oxidation behaviour under reactor relevant conditions were performed. The test conditions were fixed at an oxygen partial pressure of 10 exp -16 bars with a total pressure of 0,2 bars and a temperature of 1080 exp 0 C. The use of the X-ray diffraction analysis on the oxidised samples of type NIMONIC 80A showed the corrosion products Cr sub 2 O sub 3 , TiO sub 2 and Cr sub 2 Ti sub 2 O sub 7 in the outer oxide coating as well as Al sub 2 O sub 3 in the inner oxide zone. The samples of the alloy type INCONEL 617 showed the oxides Cr sub 2 O sub 3 and Cr sub 2 Ti sub 2 O sub 7 in the outer oxide coating. Samples of the alloy ALLOY 713LC showed Cr sub 2 O sub 3 and CrNbO sub 4 in the outer oxide coating and Al sub 2 O sub 3 in the zone of inner oxidation. Sufficient detection certainty was only ascertained by investigating samples with plane surface. For both alloys first mentioned, it was possible to prove the validity of the paralinear relationship W = k x t exp -1 / exp 2 - a x t for the increase in weight for the explanation of the time law of the oxidation. For the non-destructive determination of the oxide coating thickness on the alloys samples, the X-ray fluorescence analysis gave reproducible results of good precision. (Atomindex citation 10:481754)

JINR-6-12113 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Trace-Diffusion of Spallation Products in Polycrystalline Zirconium-beta.
A. F. Novgorodov, G. -J. Beyer, and A. S. Kovalev. 1979, 14p
In Russian.
U.S. Sales Only.

High-temperature release (F) of carrier-free isotopes of Y, Zn, Sr, Rb and Kr from Zr foils irradiated with 660 MeV protons has been studied. The release of investigated elements from Zr-beta decreases in the following order: Fsub(Zn) > Fsub(Y) > Fsub(Sr) > Fsub(Rb) > Fsub(Kr). Temperature dependence of the diffusion coefficients of these elements have been determined. The extraordinary slow diffusion of Rb and Kr in Zr-beta has been found (Dsub(Rb)/Dsub(self) approximately 0.01 and Dsub(Kr)/Dsub(self) approximately 0.002). (Atomindex citation 10:493772)

NUREG/CR-1455 PC **A13**/MF **A01**
Maryland Univ., College Park. Dept. of Mechanical Engineering.
Photoelastic Studies of Damping, Crack Propagation, and Crack Arrest in Polymers and 4340 Steel.
Annual rept.,
G. R. Irwin, D. B. Barker, R. J. Sanford, W. L. Fourney, and J. T. Metcalf. May 80, 295p

This report describes the progress made during the fifth year on a research program dealing with the dynamic characterization of fracture. The report deals with: (1) The decrease in stress intensity with time from high initiation values (KQ) to lower dynamic values (K(t)) associated with a running crack. (2) Damping losses in Araldite B, Homalite 100, and 4340 steel. (3) Damping losses associated with post arrest in Homalite 100. It investigates the effect of higher order terms (up to 6) on K determination using optical techniques (isochromatic fringes, isopachic fringes, and caustics). It describes a two dimensional, finite element, computer code that predicts dynamic crack propagation and arrest. Comparisons made of output from this code, the BCL 2-D finite difference code and laboratory experiments in Homalite 100 are also described. Results are presented of tests conducted on different heat treats of 4340. K vs a curves were determined by using high speed photography in conjunction with photoelastic coatings.

N80-22382/9 PC **A02**/MF **A01**
European Space Agency, Paris (France).
Structure and Segregations in the Solidification of Commercial Alloys. Study on the Possibilities of Carrying out Tests in Spacelab.
D. Neuschuetz, W. Gans, H. Coenen, and J. Poetschke. Jul 79, 22p ESA-TT-539-REV, BMFT-FB-W-77-08-REV
Transl. into English of "Gefuegeausbildung und Seigerungen Beim Erstarren Technischer Legierungen - Studie ueber Untersuchungsmoeglichkeiten im Spacelab", Rept. Bmft-FB-W-77-08 Dfvlr, Cologne and Fried. Krupp G.M.B.H., Essen, 5 Oct. 1978. Original Report in German Previously Announced as X79-72119.

The experimental possibilities offered by Spacelab in the domain of the structure and segregation of metals and alloys undergoing solidification are examined. A systematic analysis is made of the influence of weightlessness on the solidification of metallic melts, the preparation of a schedule of conceivable Spacelab experiments, their critical discussion, and the selection and description of the following recommendable experiments: interaction between an advancing solidification front and suspended impurities, coagulation of solid particles in metallic melts, and interfacial diffusion along the solidification front.

N80-22465/2 PC **A07**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Theory of Plastic Flow in a Thin Layer of Metal.
I. A. Kiyko. May 80, 132p NASA-TT-F-17154
Contract NSF C-504
Transl. into English of Sci. Proc. No. 15 (Moscow). 1971 65 p. Transl. By Agence Tunisienne de Public-Relations, Tunis Original DOC. Prepared by Moscow State Univ., USSR.

Analytical methods of investigation of the processes of plastic flow in a thin layer of metal inserted between the working surfaces of an instrument's part are dealt with. Approximation methods for solving concrete problems are proposed. The theoretical possibilities for the design of an instrument able to compensate in the flow process for the inaccuracy of a detail fabrication due to the finite rigidity of the instrument are analyzed. The flow processes under heat exchange conditions when the initial temperatures of the layer differ substantially from that of the instrument's parts are investigated.

N80-22466/0 PC **A03**/MF **A01**
Iowa Univ., Iowa City. Div. of Materials Engineering.
Analysis of Test System Misalignment in the Creep Test.
H. C. Wu, and T. P. Wang. 15 Apr 80, 40p
NASA-CR-162924, G302-80-002
Grant NSG-1499

Sheet type rectangular 1100-0 aluminum specimens were tested. The creep strain at the geometric centerline of the specimen is different than that at the neutral axis, and decreases with time. The effect of misalignment, which decreases with creep time, is minimized when creep tests are conducted with long pullrods and large initial strain level (high creep stress).

N80-22494/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Friction and Wear of Iron-Base Binary Alloys in Sliding Contact with Silicon Carbide in Vacuum.
K. Miyoshi, and D. H. Buckley. May 80, 11p
NASA-TP-1612, E-260

Multipass sliding friction experiments were conducted with various iron base binary alloys in contact with a single crystal silicon carbide surface in vacuum. Results indicate that the atomic size and concentration of alloy elements play important roles in controlling the transfer and friction properties of iron base binary alloys. Alloys having high solute concentration produce more transfer than do alloys having low solute concentration. The coefficient of friction during multipass sliding generally increases with an increase in the concentration of alloying element. The change of friction with succeeding passes after the initial pass also increases as the solute to iron, atomic radius ratio increases or decreases from unity.

N80-22750/7 PC **A08**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (Germany, F.R.). Inst. fuer Werkstoff-Forschung.
On the J-Integral and Other Evaluation Methods of Elastic-Plastic Fracture Mechanics as Well as on the Limits of Application of Linear-Elastic Fracture Mechanics.
H. P. Keller. Jan 79, 169p DFVLR-FB-79-03
Text in German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-617).

The critical stress intensity factor was determined for three steels and two aluminum alloys using linear elastic fracture mechanics and methods of elastic-plastic fracture mechanics. The use of the methods to determine the critical stress intensity factor for ductile crack extension on small specimens is discussed.

PB80-177702 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. Diffusion in Metals Data Center.
Influence of Manganese on the Self-Diffusion of Iron,
P. L. Gruzin, B. M. Noskov, and V. I. Shirokov. 1979, 11p DMDC-23003, TT-79-58095(C)
Trans. of Problemy Metallovedeniya i Fiziki Metallov (USSR) n4 p503-508 n.d. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

This is a study of the influence of the different elements on the parameters of self-diffusion of iron and is one of the most important problems connected with the self-diffusion of this element. The study of the influence of manganese additions on the self-diffusion of iron in austenite is of special importance, because manganese is an unavoidable impurity in almost all steel and iron-based alloys. Therefore, this study of the temperature dependence of the self-diffusion coefficients of iron in the gamma-phase of the iron-manganese alloys was carried out by the method of radioactive isotopes using radioactive iron isotope Fe59. The self-diffusion coefficients were calculated from the measurements of the integral radioactivity of the sample during successive removal of layers. Eight iron-manganese alloys were investigated in the temperature interval 950-1350C.

PB80-177710 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. Diffusion in Metals Data Center.
Influence of Doping on Self-Diffusion of Cobalt,
P. L. Gruzin, and B. M. Noskov. 1979, 14p
DMDC-23004, TT-79-58095(D)
Trans. of Problemy Metallovedeniya i Fiziki Metallov (USSR) n4 p509-516 n.d. Sponsored in part by National Science Information, Washington, DC. Special Foreign Currency Science Information Program.

The self-diffusion of Co60 in pure Co & Co-Cr, Co-Ni, Co-Ni-Cr, Co-Fe, Co-Fe-Ti alloys was measured in the temperature range 110 to 1350C. The experimental technique employed was the residual activity method. Lattice diffusion coefficients and grain boundary diffusion coefficients were measured. Plots of the data and Arrhenius equations are presented. Composition dependence are also reported.

PB80-178403 Not available NTIS
National Bureau of Standards, Washington, DC.
Anomalous Low-Temperature Elastic-Constant Behavior in Fe-13 Cr-19 Mn.
Final rept.,
H. M. Ledbetter. Mar 80, 2p
Sponsored in part by National Science Foundation, Washington, DC., and Department of Energy, Washington, DC.
Pub. in Metall. Trans. 11A, p543-544 Mar 80.

Elastic constants determined by sound-velocity measurements in an Fe-13Cr-19Mn steel show anomalous temperature behavior around 274 K, indicating a paramagnetic-antiferromagnetic transition.

PB80-178411 Not available NTIS
National Bureau of Standards, Washington, DC.
Convective and Interfacial Instabilities during Unidirectional Solidification of a Binary Alloy.
Final rept.,
S. R. Coriell, M. R. Cordes, W. J. Boettinger, and R. F. Sekerka. May 80, 16p
Sponsored in part by National Aeronautics and Space Administration, Washington, DC., and National Science Foundation, Washington, DC.
Pub. in Jnl. Cryst. Growth 49, n1 p13-28 May 80.

The onset of coupled convective and constitutional interfacial instabilities during the directional solidification of a single phase binary alloy at constant velocity vertically upwards (positive z-direction) is treated by a linear stability analysis. The authors consider a system for which the temperature gradient alone would cause a negative density gradient and the solute gradient alone would cause a positive density gradient. The temperature and concentration fields are coupled through the hydrodynamic equations. The solidification boundary conditions at the solid-liquid interface couple the hydrodynamic and interfacial stability phenomena. Specific calculations were made for physical properties appropriate to the solidification of lead containing tin. Results indicate that the stability-instability criterion differs substantially from the criterion of a net neutral density gradient.

PB80-178866 Not available NTIS
National Bureau of Standards, Washington, DC.
Elastic-Constant Variability in Stainless-Steel 304.
Final rept.,
H. M. Ledbetter, N. V. Frederick, and M. W. Austin. Jan 80, 5p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Jnl. Appl. Phys. 51, n1 p305-309 Jan 80.

Variability of elastic constants in stainless-steel 304 was determined by measuring longitudinal and transverse ultrasonic velocities in 20 samples acquired randomly. Three kinds of variations--sample to sample, directional within a sample, and repeated measurements on a single sample--are reported for four elastic constants: the bulk modulus, Young's modulus, shear modulus, and Poisson's ratio. Because of surprisingly small variations, 1% or less, the principal problem became measurement sensitivity and reproducibility. To overcome this problem, a high-resolution measurement system was devised using general-purpose equipment augmented with a very simple impedance-transforming amplifier and an FET transmission gate. With this system the often-reported troublesome transit-time correction disappeared. Effects due to frequency and directionality were negligible.

PB80-179088 PC **A10**/MF **A01**
National Materials Advisory Board (NRC), Washington, DC.
Supply and Use Patterns for the Platinum-Group Metals.
Final rept.
1980, 220p NMAB-359
Contract GS-00-DS-(P)-94008
Sponsored in part by Department of Commerce, Washington, DC., and Bureau of Mines, Washington, DC.

This study consists of a survey of up-to-date background information on the chemistry, geology, and supply sources and a detailed evaluation of current and future usage for all six platinum-group metals. The extensive use of platinum, palladium, and later, rhodium in automotive emission-control systems is projected to continue for some time. Recycling of spent or discarded catalytic converters is advised as an important source of the platinum-group metals they contain, but the current (1978) economic picture appears to make this activity marginal at best. The content of the National Stockpile is reviewed and the need to increase the amounts and to upgrade the forms to existing specifications is shown. In addition, it is recommended that rhodium be added to the stockpile list as a critical and strategic material. Contingencies for the platinum-group metals are examined and alternative actions are identified, including encouraging the development of a domestic or continental source of supply as insurance against loss of supply. Domestic refineries state that their capacity is adequate for handling current and anticipated future needs.

PB80-179120 PC **A04**/MF **A01**
Utah Univ., Salt Lake City.
Modeling of the Leaching of Oxide Copper Ores.
Final rept.,
Dong G. Chae, and Milton E. Wadsworth. 31 Dec 79, 62p BUMINES-OFR-52-80
Grant G0166022

A model for the leaching of oxide ores is developed and correlated with laboratory tests for percolation leaching of copper oxide ore. Using the model, recovery of metal values and lixiviant concentration of the effluent solution at any time may be evaluated. For the copper oxide ore, a simplified version of the model is examined for the leaching mechanism consisting of (1) a surface flush reaction with the highest rate of lixiviant consumption, (2) penetration of the lixiviant to react with copper minerals and gangue constituents, and (3) slow lixiviant consumption mostly by residual gangue materials. The simplified model is able to explain reasonably the leaching behavior of copper oxide ore by introducing a concept of effective initial size to correct for packing in a bed of fine particles.

PB80-179278 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. Diffusion in Metals Data Center.
Study of alpha-Iron Self-Diffusion,
V. M. Golikov, and V. T. Borisov. 1979, 22p
DMDC-23006, TT-79-58095(F)
Trans. of Problemy Metallovedeniya i Fiziki Metallov (USSR) n4 p528-542 n.d. See also PB80-168081. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

A method for the determination of small self-diffusion coefficients is given. For the determination of the diffusion coefficient, no preliminary determination of the absorption coefficient of beta-rays is required. In general, the absorption function does not seriously affect the ratio I(t)/I(t sub o). A method of calculation of the isotope composition of a compound is shown. The quantity K is introduced into the expression determining the diffusion coefficient (K accounts for the isotope composition) and is characteristic for the counting device. The temperature dependence of the self-diffusion coefficient of alpha-iron has been determined in the temperature interval 650-850C. The activation energy of the self-diffusion of alpha-iron is equal to 6.71 x 10,000 cal/mole.

PB80-180011 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. Diffusion in Metals Data Center.
Influence of Chromium on the Self-Diffusion of Iron,
P. L. Gruzin. 1979, 10p DMDC-23005, TT-79-58095(E)
Trans. of Problemy Metallovedeniya i Fiziki Metallov (USSR) n4 p524-527 n.d. See also PB80-168081. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

The self-diffusion of Fe59 in two iron-chromium alloys was measured in the temperature range 1100 to 1250C. Alloys contained 4 and 8wt.%Cr. The residual activity technique was employed as the experimental method. Measurements of diffusivities are described by Arrhenius equations. All measurements are made in the gamma phase.

PB80-180250 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Energy and Minerals Div.
Industrial Wastes: An Unexplored Source of Valuable Minerals.
Report to the Congress.
15 May 80, 83p EMD-80-45

The report points out that industrial wastes often contain valuable metals, and are often disposed of in ways that preclude the future recovery of mineral values. Although Congress passed the Resource Conservation and Recovery Act of 1976 to, among other objectives, improve the recovery of usable materials from waste, the Executive Branch has done little to enhance mineral recovery, especially from industrial wastes.

PB80-180300 Not available NTIS
National Bureau of Standards, Washington, DC.
Determination of Content of Combustible Material in Ferrous Scrap Recovered from Refuse.
Final rept.,
Z. Kahn, E. J. Duckett, and J. Early. 1979, 4p
Pub. in Resource Recov. Conserv. Short Commun. 4, p301-304 1979.

The results of combustion experiments on ferrous scrap recovered from refuse suggests that the test procedure contained in a proposed ASTM standard provides a generally reliable method of determining the combustibles content of the ferrous scrap. Although the number of tests conducted was limited, the absence of a significant variation in the results indicates a high degree of reproducibility in the data obtained.

PB80-180979 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. Diffusion in Metals Data Center.
Self-Diffusion of Tantalum,
P. L. Gruzin, and V. I. Meshkov. 1979, 8p DMDC-23008, TT-79-58095(H)
Trans. of Problemy Metallovedeniya i Fiziki Metallov (USSR) n4 p570-573 n.d. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

The self diffusion of radioactive Ta-182 in Ta was measured in the temperature range 1200 to 1300C using the residual activity experimental technique. An Arrhenius plot yielded the diffusion parameters for the diffusion equation.

PB80-180987 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. Diffusion in Metals Data Center.
Theory of the Methods to Determine the Dependence of Diffusion Coefficients in Solid Solutions on Concentration,
B. Ya. Lyubov, and B. E. Maksimov. 1979, 36p DMDC-23007, TT-79-58095(G)
Trans. of Problemy Metallovedeniya i Fiziki Metallov (USSR) n4 p543-569 n.d. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

A method is developed for the approximate estimation of the concentration dependence of diffusion coefficients according to experimental data. A set of certain simplified assumptions is employed in the method. The diffusion of C in gamma iron is shown in a typical calculation. The diffusion of radioactive Cr from an Fe-Cr alloy into another Fe-Cr alloy is used to illustrate the concentration dependence of an interdiffusion coefficient.

PB80-181902 PC **A03**/MF **A01**
GCA Corp., Bedford, MA. GCA Technology Div.
Assessment of Corrosion Products from Once-through Cooling Systems with Mechanical Antifouling Devices.
Final rept. Jan-Apr 79,
Charles M. Spooner. Jan 80, 50p GCA-TR-79-46-G, EPA-600/7-80-026
Contract EPA-68-02-2607

The report gives results of an assessment of corrosion products from steam-electric power plant once-through cooling systems equipped with mechanical antifouling devices. (About 67% of the currently operating plants in the U.S. use once-through cooling systems. Various cleaning mechanisms, used to minimize the reduction of the thermal efficiency of heat exchange in the condenser tubes--caused by corrosion and biofouling--include chemical and off-and on-line mechanical methods.) On-line mechanical cleaning may lead to increased levels of metals in the effluent due to abrasion of the condenser tubes. Since some abraded metals at sufficiently high concentrations harm aquatic organisms and lead to other environmental damage, metal concentrations in cooling water discharges which stem from on-line mechanical condenser tube cleaning systems need to be determined. This report addresses the significance of this effect, based mainly on comments from utilities experienced with the Amertap system and from the manufacturer.

RRC-26 PC **A02**/MF **A01**
Reactor Research Centre, Kalpakkam (India).
Measurement of delta Ferrite by Magnetic Saturation Method.
R. Prabhakar, and R. D. Kale. Sep 78, 14p
U.S. Sales Only.

The magnetic saturation method can be used to determine absolute delta ferrite content of an austenitic weld metal. This report describes an apparatus based on above method that has been developed at Reactor Research Centre. With this apparatus ferrite measurements can be carried out to an accuracy of +- 1% ferrite. The report also briefly reviews other methods of measuring absolute ferrite content. Results obtained with the apparatus developed at RRC are compared with results from metallographic method and ferritescope and from a similar equipment in another laboratory. (Atomindex citation 10:478856)

11H. Oils, Lubricants, and Hydraulic Fluids

N80-22493/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Steady-State Wear and Friction in Boundary Lubrication Studies.
W. R. Loomis, and W. R. Jones, Jr.. May 80, 11p NASA-TP-1658, E-129

A friction and wear study was made at 20 C to obtain improved reproducibility and reliability in boundary lubrication testing. Ester-base and C-ether-base fluids were used to lubricate a pure iron rider in sliding contact with a rotating M-50 steel disk in a friction and wear apparatus. Conditions included loads of 1/2 and 1 kg and sliding velocities of 3.6 to 18.2 m/min in a dry air atmosphere and stepwise time intervals from 1 to 250 min for wear measurements. The wear rate results were compared with those from previous studies where a single 25 min test period was used. Satisfactory test conditions for studying friction and wear in boundary lubrication for this apparatus were found to be 1 kg load; sliding velocities of 7.1 to 9.1 m/min (50 rpm disk speed); and use of a time stepwise test procedure. Highly reproducible steady-state wear rates and steady-state friction coefficients were determined under boundary conditions. Wear rates and coefficients of friction were constant following initially high values during run-in periods.

PB80-181985 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Evaluation of Analube Synthetic Lubricant.
Technical rept.
Jul 74, 6p EPA-AA-TAEB-75-1

The Environmental Lubricants Company of New Britain, Connecticut, contacted the Office of Air and Water Programs to request a laboratory and engineering evaluation of their polyglycol base synthetic lubricant. Supplied with the request was a test report indicating significant reductions of exhaust emissions and fuel economy improvement. A confirmatory test program was conducted by the Technology Assessment and Evaluation Branch of the Emission Control Technology Division. Analube is a synthetic lubricant formulated from a polyglycol base with a molybdenum compound for lubricity. This synthetic lubricant is marketed as a replacement for the normal hydrocarbon motor oils. There was no cost information provided by the manufacturer.

PB80-811284 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Lubricating Oil Analysis for Wear Monitoring. 1964-March, 1980 (Citations from the American Petroleum Institute Data Base).
Rept. for 1964-Mar 80,
Diane M. Cavagnaro. Jun 80, 136p
Supersedes NTIS/PS-79/0383 and NTIS/PS-78/0338. For the companion Published Search of the NTIS Data Base, see PB80-807688.

This bibliography presents abstracts of worldwide work on the methods and results of analyzing engine oils to study wear processes in internal combustion engines. Methods used include radioactive tracers, liquid scintillation counting, spectrometry, sonic analysis, scanning electron microscopy, and many others. Programs to predict incipient engine failure are also reported. (This updated bivliography contains 129 abstracts, 11 of which are new entries to the previous edition.)

11I. Plastics

AD-A083 891/2 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Hard Polyurethane and the Process to Obtain It.
28 Mar 80, 4p Rept no. FTD-ID(RS)T-0170-80
Edited trans. of Revista de Chimie (Romania) v29 n3 p213 Mar 78, by Mina Winters.

No abstract available.

N80-22492/6 PC **A09**/MF **A01**
Solar Turbines International, San Diego, CA.
Development of Fire-Resistant, Low Smoke Generating, Thermally Stable End Items for Commercial Aircraft and Spacecraft Using a Basic Polyimide Resin.
Final Report, 15 Dec. 1977 - 15 Apr. 1980.
J. Gagliani, R. Lee, U. A. K. Sorathia, and A. L. Wilcoxson. 15 Apr 80, 176p NASA-CR-160576, SR79-R-4674-38
Contract NAS9-15484

A terpolyimide precursor was developed which can be foamed by microwave methods and yields foams possessing the best seating properties. A continuous process, based on spray drying techniques, permits production of polyimide powder precursors in large quantities. The constrained rise foaming process permits fabrication of rigid foam panels with improved mechanical properties and

almost unlimited density characteristics. Polyimide foam core rigid panels were produced by this technique with woven fiberglass fabric bonded to each side of the panel in a one step microwave process. The fire resistance of polyimide foams was significantly improved by the addition of ceramic fibers to the powder precursors. Foams produced from these compositions are flexible, possess good acoustical attenuation and meet the minimum burnthrough requirements when impinged by high flux flame sources.

11J. Rubbers

BDX-613-2228 PC **A04**/MF **A01**
Bendix Corp., Kansas City, MO.
B-10 Analysis.
W. E. Holland. Feb 80, 57p
Contract EY-76-C-04-0613

A method was developed to determine if boron-loaded polymeric material contained enriched boron or natural boron. A prototype analyzer was constructed, and initial planning was done for an actual analysis facility. (ERA citation 05:016241)

N80-22733/3 PC **A08**/MF **A01**
Mechanical Technology, Inc., Latham, NY.
Development of Procedures for Calculating Stiffness and Damping of Elastomers in Engineering Applications, Part 6.
A. Rieger, G. Burgess, and E. Zorzi. Apr 80, 157p
NASA-CR-159838, MTI-80TR29
Contract NAS3-18546

An elastomer damper was designed, tested, and compared with the performance of a hydraulic damper for a power transmission shaft. The six button Viton-70 damper was designed so that the elastomer damper or the hydraulic damper could be activated without upsetting the imbalance condition of the assembly. This permitted a direct comparison of damper effectiveness. The elastomer damper consistently performed better than the hydraulic mount and permitted stable operation of the power transmission shaft to speeds higher than obtained with the squeeze film damper. Tests were performed on shear specimens of Viton-79, Buna-N, EPDM, and Neoprene to determine performance limitations imposed by strain, temperature, and frequency. Frequencies of between 110 Hz and 1100 Hz were surveyed with imposed strains between 0.0005 and 0.08 at temperatures of 32 C, 66 C, and 80 C. A set of design curves was generated in a unified format for each of the elastomer materials.

PAT-APPL-6-095 866 PC **A02**/MF **A01**
Department of the Navy Washington DC
Nitrile Rubber Adhesion.
Patent Application,
Mattin H. Kaufman. Filed 19 Nov 79, 15p AD-D007 178/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention discloses a method for converting a nitrile rubber substrate surface to a chemically active surface where upon said surface reacts with an adhesive to form a permanent bond with said adhesive. The nitrile rubber substrate surface is so converted by treatment with a dilute mineral acid. (Author)

SAND-79-2157C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Use of Glow Discharge Techniques to Improve the Environmental Resistance and Lubricity of Elastomers for Use in Deep Sour Gas Wells.
C. Arnold, Jr., and K. W. Bieg. 1979, 4p CONF-800303-7
Contract EY-76-C-04-0789
179. national meeting of the American Chemical Society, Houston, TX, USA, 23 Mar 1980.

An ethylene/propylene elastomer treated with TFE and argon, separately, in a glow discharge exhibited improved environmental resistance to sour gas and steam at 275 exp 0 C at ambient pressures. Enhanced lubricity and wear of Buna N O-rings was achieved with glow discharge polymerized TFE. In this case, a polymeric fluorocarbon coating was deposited on the surface of the rubber. (ERA citation 05:014824)

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

AD-A083 629/6 PC **A04**/MF **A01**
Stevens Inst of Tech Hoboken NJ Davidson Lab
Demonstration of a Stochastic Analysis Technique for Nonlinear Dynamical Systems.
Final rept. Sep 78-Sep 79,
Charles J. Henry. Sep 79, 52p Rept no. SIT-DL-79-9-2033
Contract N00014-78-C-0783

In order to demonstrate a promising technique, the control gain for a nonlinear, first order system with limited control and with random input, required to obtain a limited range of state with given likelihood is evaluated. The proposed technique is based on a series approximation for the solution of the partial differential equation for the joint probability density function of the state variable, i.e., the Fokker-Planck Equation. For the simple illustrative example, the exact stationary density function is found to give control gains in good agreement with the proposed series approximation technique. The exact and approximate variances of state are also found in good agreement, but the fourth order moments begin to show some discrepancy and the detailed density functions do not show good agreement. However, for many control problems and for system performance analysis, accurate prediction of means and second order moments is sufficient, as was found for the illustrate example. The series solution technique is further demonstrated by calculating the transient state density function with given initial condition for the same nonlinear, first order system. The results are discussed and elaborated in order to indicate the significance of this promising technique. (Author)

AD-A083 634/6 PC **A02**/MF **A01**
Control Dynamics Co Huntsville AL
A Mathematical Means of Spreading Clustered System Roots.
Technical rept.,
S. M. Seltzer. 21 Nov 79, 23p DRSMI/RG-CR-80-3
Contract DAAK40-79-C-0213

The purpose of the study reported upon herein is to investigate the potential existence of a clustering of system poles and zeros in the z-domain. This potential is shown to exist. A means of separating the clustering is proposed by mapping from the complex z-domain onto the complex w-domain. The reason for so doing is to ameliorate computational difficulties that can arise as the result of closely clustered roots. It was shown that such a situation could occur, but that there are design techniques to prevent it. If these fail, an alternate approach is described whereby the system poles and zeros are transformed from the complex z-domain to the complex w-domain. It then is possible to increase the scaling (in the w-domain) with significant effect in separating the clustered poles and zeros, thereby obviating computational difficulties that might have arisen because of the clustering in the z-domain.

AD-A083 696/5 PC **A03**/MF **A01**
Carnegie-Mellon Univ Pittsburgh PA Management Sciences Research Group
The Implicit Complementarity Problem: Part I.
Management science research rept.,
Jong-Shi Pang. Apr 80, 32p Rept no. MSRR-458-PT-1
Contract N00014-75-C-0621
See also Part 2, AD-A083 697.

Given an n by n matrix A,n-vector b and a mapping m from R superscript n into R superscript n, the implicit complementary problem is to find a vector x in R superscript n so that Ax + b > or = 0, X > or = m(x) and (Ax + b) (transposed) (x - m(x)) = 0. This is the first of two papers in which we study this complementarity problem via an implicitly defined mapping F which depends on a given splitting of the matrix A. In the present paper, we derive sufficient conditions for the problem to have a unique solution for each vector b and study the problem in connection with a least-element theory. (Author)

AD-A083 697/3 PC **A02**/MF **A01**
Carnegie-Mellon Univ Pittsburgh PA Management Sciences Research Group
The Implicit Complementarity Problem: Part II.
Management science research rept.,
Jong-Shi Pang. Apr 80, 21p Rept no. MSRR-459-PT-2
Contract N00014-75-C-0621
See also Part 1, AD-A083 696.

In the present paper, a convergence theory is established for a certain iterative algorithm to solve the implicit complementarity problem. Also demonstrated is how the algorithm includes as special cases many existing iterative methods for solving a linear complementarity problem.

AD-A083 698/1 PC **A02**/MF **A01**
Carnegie-Mellon Univ Pittsburgh PA Management Sciences Research Group
An Extension of Saigal's Class of Q-Matrices.
Management science research rept.,
Jong-Shi Pang. Feb 80, 12p Rept no. MSRR-454
Contract N00014-75-C-0621

This note presents a class of Q-matrices which includes Saigal's class of Q-matrices with negative principal minors and the class of semimonotone Q-matrices. (Author)

AD-A083 802/9 PC **A03**/MF **A01**
North Carolina Univ At Chapel Hill Inst of Statistics
Extreme Value Theory for Continuous Parameter Stationary Processes.
Technical rept.,
M. R. Leadbetter. Mar 80, 41p Rept no. MM-SER-1276
Contract N00014-75-C-0809

In this paper the central distributional results of classical extreme value theory are obtained, under appropriate dependence restrictions, for maxima of continuous parameter stochastic processes. In particular we prove the basic result (here called Gnedenko's Theorem) concerning the existence of just three types of non-degenerate limiting distributions in such cases, and give necessary and sufficient conditions for each to apply. The development relies, in part, on the corresponding known theory for stationary sequences. The general theory given does not finiteness of the number of upcrossings of any level x. However when the number per unit time is a.s. finite and has a finite mean mu(x), it is found that the classical criteria for domains of attraction apply when mu(x) is used in lieu of the tail of the marginal distribution function. The theory is specialized to this case and applied to give the general known results for stationary normal processes (for which mu(x) may or may not be finite). A general Poisson convergence theorem is given for high level upcrossings, together with its implications for the asymptotic distributions of r-th local maxima. (Author)

AD-A083 807/8 PC **A04**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Equilibria of the Curvature Functional and Manifolds of Nonlinear Interpolating Spline Curves.
Technical summary rept.,
Michael Golomb, and Joseph Jerome. Nov 79, 70p Rept no. MRC-TSR-2024
Contract DAAG29-75-C-0024, Grant NSF-MPS-74-02292

The mathematical formulation of curve fitting by mechanical splines, i.e. thin, flexible, elastic beams passing through freely rotating sleeves anchored at fixed locations, is studied in this report. These are called elastica or nonlinear spline curves. As contrasted with the mathematically idealized splines, which have proven to be of considerable utility and concerning which much information is available, the nonlinear splines are relatively poorly understood. The writers are attempting to understand and systematically construct these curves. Computer graphics obtained by other workers suggest remarkable efficiency of the elastica for curve fitting. This is perhaps not too surprising since the nonlinear spline represents an equilibrium position of a thin beam.

AD-A083 808/6 PC **A04**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center

Moving-Weighted-Average Smoothing Extended to the Extremities of the Data. Revision.
Technical summary rept.,
T. N. E. Greville. Nov 79, 69p Rept no. MRC-TSR-2025
Contract DAAG29-75-C-0024
Errata sheet inserted. Revision to Rept. no. MRC-TSR-1786, AD-A046 380.

The use of a symmetrical moving weighted average of 2m + 1 terms to smooth equally spaced observations of a function of one variable does not yield smoothed values of the first m and the last m observations, unless additional data beyond the range of the original observations are available. By means of analogies to the Whittaker smoothing process and some related mathematical concepts, a natural method is developed for extending the smoothing to the extremities of the data as a single overall matrix-vector operation having a well defined structure, rather than as something extra grafted on at the ends. (Author)

AD-A083 809/4 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Computer Calculation of Mechanisms Involving Intermittent Motions.
Technical summary rept.,
B. Noble, and H. S. Hung. Dec 79, 43p Rept no. MRC-TSR-2026
Contract DAAG29-75-C-0024

This paper deals with a simple computational approach to the analysis of dynamical systems involving intermittent motion in which the velocities involved can be discontinuous due to impulsive forces, impact, mass capture, and mass release. The sequence of these events may not be known ahead of time, and may in fact be one of the things we wish the computer to determine. The dynamical equations are formulated using a logical function method due to P. Ehle. The resulting system of ordinary differential equations with discontinuous coefficients is integrated using a standard computer code in regions where the coefficients are continuous. When discontinuities occur, jump conditions across the discontinuity are used to express the new velocities in terms of the old, and the ordinary differential equation solver is simply restarted with new initial conditions. To illustrate the simplicity of the approach, the method is applied to a dynamical system of ten masses considered by Ehle. The computer code and numerical results are included. (Author)

AD-A083 810/2 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Coincident Bifurcation of Equilibrium and Periodic Solutions of Evolution Equations.
Technical summary rept.,
Michael Shearer. Dec 79, 27p Rept no. MRC-TSR-2027
Contract DAAG29-75-C-0024

Bifurcation of equilibrium and periodic solutions of nonlinear evolution equations is considered in the neighbourhood of an equilibrium solution for which the corresponding linear problem admits both non-zero equilibrium and non-constant periodic solutions. These solutions of the linear problem are related to those of the nonlinear equation by deriving bifurcation equations possessing a simple symmetry property. This results in a simplification of the bifurcation analysis, illustrated by a discussion of two important special cases exhibiting secondary bifurcation of periodic solutions. (Author)

AD-A083 811/0 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
A Simple Derivation of Glassman's General N Fast Fourier Transform.
Technical summary rept.,
Warren E. Ferguson, Jr. Dec 79, 21p Rept no. MRC-TSR-2029
Contract DAAG29-75-C-0024, Grant NSF-MCS-78-09525

A simple derivation of Glassman's general N fast Fourier transform, and corresponding FORTRAN program, is presented. This fast Fourier transform is based upon a representation of the discrete Fourier transform matrix as a product of sparse matrices. (Author)

AD-A083 812/8 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Forced Oscillations of Nonlinear Hamiltonian Systems, II.
Technical summary rept.,
Ivar Ekeland. Dec 79, 26p Rept no. MRC-TSR-2030
Contract DAAG29-75-C-0024

We study periodic solutions of the nonlinear Hamiltonian system with n degrees of freedom, the Hamiltonian H being convex and super quadratic in both variables, and the forcing terms being T-periodic with mean value zero. We prove that, if these forcing terms lie within bounds which we explicitly compute, system (H has some T-periodic solution, which we also locate explicitly.

AD-A083 814/4 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Convergent Approximations in Parabolic Variationally Inequalities. I. One-Phase Stefan Problems.
Technical summary rept.,
Joseph W. Jerome. Jan 80, 25p Rept no. MRC-TSR-2032
Contract DAAG29-75-C-0024

Many physical phenomena are modelled by inequalities rather than equations. In this report we examine a dynamic, or parabolic inequality, which characterizes the change of phase of a substance, e.g., ice melting, under certain assumptions. We obtain rates of convergence for certain approximation schemes which separately discretize time and space. The rates, as well as one of the schemes, appear to constitute new results in a subject which is still rather undeveloped. Subsequent investigations are also contemplated for inequalities related to different physical models.

AD-A083 817/7 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Metrically Upper Semicontinuous Multifunctions and Their Intersections.
Technical summary rept.,
Szymon Dolecki. Jan 80, 50p Rept no. MRC-TSR-2035
Contract DAAG29-75-C-0024, Grant AFOSR-79-0018

We present a variety of methods for establishing metric upper semicontinuity. We give conditions for the intersection of metric upper semicontinuous multifunctions to be metric upper semicontinuous and discuss their applicability. The study of metric upper semicontinuity (stability) is of importance in optimization theory. The report discusses classical and recent techniques of establishing metric upper semicontinuity and provides their extensions. The metric upper semicontinuity of intersections, the importance of which has been recognized only recently, and several applications to optimization problems are discussed. (Author)

AD-A083 818/5 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
The Solutions to a Smooth PDE Can Be Dense in C(I).
Technical summary rept.,
R. C. Buck. Feb 80, 12p Rept no. MRC-TSR-2036
Contract DAAG29-75-C-0024, Grant NSF-MCS-78-07422

The solutions to a partial differential equation that arises in the physical sciences are expected to be restricted in nature, since they are intended to represent some physically significant behavior. In particular, they can approximate the general continuous function on a compact set K only if K is 'thin', e.g., nowhere dense in Rsuperscript n. The purpose of this note is to show that this does not hold for all smooth partial differential equations. Specifically, for any n > or = 2 there exist partial differential equations of polynomial type on Rsuperscript n whose Cat infinity solutions are uniformly dense in the space C(I) of all continuous functions on the n-cube I. (Author)

AD-A083 819/3 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
New Algorithms for Nonlinear Least Squares and Bayesian Parameter Estimation.
Technical summary rept.,
Warren E. Stewart, and Jan P. Sorensen. Feb 80, 27p Rept no. MRC-TSR-2037
Contract DAAG29-75-C-0024, Grant NSF-ENG-76-24368

Some new algorithms are presented for fitting mathematical models to multiple-response experiments. These algorithms give estimates of the parameters in a user-defined predictor model, and also estimate the parameters of a Gaussian model of the observational error distribution. The development is based on Bayes' theorem, and provides a natural extension of known least-squares estimation methods. Allowance is made for missing values of responses, which occur frequently in practical work.

AD-A083 821/9 PC **A08**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Singularly Perturbed Equations in the Critical Case.
Technical summary rept.,
A. B. Vasil'eva, and V. F. Butuzov. Feb 80, 161p Rept no. MRC-TSR-2039
Contract DAAG29-75-C-0024, Grant NSF-MCS78-00907
Trans. of mono. (USSR) 1978, by F. A. Howes.

This monograph is a sequel to the authors' work 'Asymptotic Expansions of Solutions of Singularly Perturbed Equations', Nauka, 1973. It considers cases in which the characteristic equation has zero roots. In the book many applications are given to concrete physical problems including a detailed examination of several problems in kinetics, in the theory of semiconductors, in numerical difference schemes, etc. The usual mathematical preparation of an engineer is sufficient for understanding the results. (Author)

AD-A083 824/3 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
High Order Difference Methods for Quasilinear Elliptic Boundary Value Problems on General Regions.
Technical summary rept.,
Klaus Boehmer. Feb 80, 47p Rept no. MRC-TSR-2042
Contract DAAG29-75-C-0024

Stability and convergence for a difference method for quasilinear elliptic boundary value problems are proved. Asymptotic expansions of the discretization error, basic for Richardson extrapolation, are established. The general theory of discrete Newton methods and iterated defect corrections via neighboring problems and Pereyra's deferred corrections are used to derive different high order methods. Some special cases and computational problems are pointed out and numerical tests are included. (Author)

AD-A083 825/0 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
The Peano Curve of Schoenberg is Nowhere Differentiable.
Technical summary rept.,
James Alsina. Feb 80, 19p Rept no. MRC-TSR-2043
Contract DAAG29-75-C-0024

Well known are examples of area-filling curves, and of continuous functions which are nowhere differentiable. This paper brings together these two pathological properties by showing that the area-filling curve described, lacks, at every point, a finite derivative.

AD-A083 826/8 PC **A05**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Contingent Derivatives of Set-Valued Maps and Existence of Solutions to Nonlinear Inclusions and Differential Inclusions.
Technical summary rept.,
Jean Pierre Aubin. Feb 80, 92p Rept no. MRC-TSR-2044
Contract DAAG29-75-C-0024

We use the Bouligand contingent cone to a subset K of a Hilbert space at x an element of K for defining contingent derivatives of a set-valued map, whose graphs are the contingent cones to the graph of this map, as well as the upper contingent derivatives of a real valued function. We develop a calculus of these concepts and show how they are involved in optimization problems and in solving equations f(x) = 0 and/or inclusions 0 an element of F(x). They also play a fundamental role for generalizing the Nagumo theorem on flow invariance and for generalizing the concept of Liapunov functions for differential equations and/or differential inclusions. (Author)

AD-A083 828/4 PC **A05**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Spherically Symmetric Waves of a Reaction-Diffusion Equation.
Technical summary rept.,
Christopher K. R. T. Jones. Feb 80, 100p Rept no. MRC-TSR-2046
Contract DAAG29-75-C-0024, Grant DAAG29-77-G-0004
Doctoral thesis.

Reaction-Diffusion Equations have been used to model nerve impulse propagation and spatially inhomogeneous situations in chemically reacting systems and population genetics. The kind of solutions that are often of interest in these areas are wave-like and do not die out. If the underlying spatial domain for the equation is one-dimensional, the description of such wave behaviour amounts to finding a travelling wave. This is a solution whose evolution in time under the equation is given by translating along the axis. A nerve impulse is an example of a travelling wave. If a wave in higher dimensions is expected, for instance one that is a function oniy of radius in a spherical co-ordinate system, this mathematical approach is not available. Such spherical waves look like one dimensional wave a long way out. In this report we invert this idea and deduce spherical wave behaviour in a model example where there is a stable one dimensional travelling wave. This approach also determines the remaining work that is necessary for a complete picture of the spherical wave behaviour for this equation.

AD-A083 829/2 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
A Nonlinear Volterra Equation in Variable Domain.
Technical summary rept.,
Hedy Attouch, and Alain Damlamian. Dec 79, 11p Rept no. MRC-TSR-2028
Contract DAAG29-75-C-0024

We prove the existence and uniqueness of a strong solution of a nonlinear heat flow equation governing the temperature in a homogeneous material with memory when the temperature outside of a smooth time dependent domain Omega(t) is prescribed. (Author)

AD-A083 840/9 PC **A03**/MF **A01**
Naval Postgraduate School Monterey CA
Smooth Interpolation of Large Sets of Scattered Data.
Technical rept. Jan-Mar 79,
Richard Franke, and Greg Nielson. 9 Mar 79, 37p Rept no. NPS-53-79-005

Methods for solving the following data fitting problems are discussed: Given the data (xi,yi,fi), i = 1,...,N construct a smooth bivariate function S with the property that S(xi,yi) = fi, i = 1,...,N. Because the desire to fit this type of data is encountered frequently in many areas of scientific applications, an investigation of the available methods for solving this problem was undertaken. Several aspects, such as computational efficiency, fitting characteristics and ease of implementation, were analyzed and compared. Within the context of a general purpose method for large sets of data, two of these methods emerged as being generally superior to the others. It is the purpose of this paper to describe these two methods and present examples illustrating their use and application. FORTRAN programs which implement these methods are available upon request. (Author)

AD-A083 902/7 PC **A03**/MF **A01**
Missouri Univ-Columbia Dept of Statistics
A Selection Procedure Using a Screening Variate.
Technical rept.,
Richard W. Madsen. Mar 80, 26p Rept no. TR-90
Contract N00014-76-C-0789

Consider N objects on which two correlated measurements X and Y can be made. Assume that the probability that the Y measurement meets a certain specification is gamma. We present a method whereby a maximal subset of m out of the N objects can be chosen, based on the observed X measurements, so that there is a high probability that a large proportion of the selected subset will meet the desired specification related to the Y measurement. The method we propose uses the conditional probabilities that Y will meet the specification given by the observed value of the x's. The procedure compared favorably with one suggested by Owen, Chen, and Li but has the advantage that no special tables are needed. (Author)

AD-A083 903/5 PC **A03**/MF **A01**
Missouri Univ-Columbia Dept of Statistics
Maximum Likelihood Estimation of the Survival Functions of Stochastically Ordered Random Variables.
Technical rept.,
Richard L. Dykstra. Mar 80, 26p Rept no. TR-91
Contract N00014-78-C-0655

Many times populations exist which logically must satisfy a stochastic ordering requirement. Nevertheless, estimates of these populations may not bear out this stochastic ordering because of the inherent variability of the observations. This paper will consider the problem of finding maximum likelihood estimates of stochastically ordered survival functions for the cases (a) one survival being fixed in advance and (b) estimating both survival functions when the data includes censored observations. A numerical example is handled in detail to illustrate the solution to this problem. (Author)

AD-A083 963/9 PC **A02**/MF **A01**
Brown Univ Providence RI Div of Engineering
Control of Nonlinear Systems.
Progress rept. no. 5 (Final), 1 Jan 75-31 Dec 79,
Allan E. Pearson. 26 Feb 80, 22p AFOSR-TR-80-0252
Grant AFOSR-75-2793

The research falls under six main categories: feedback stabilization methods for linear systems, including time varying, discrete, continuous, differential-delay and linear systems subject to average power constraints; controllability for a class of nonlinear systems; minimum energy regulators for commutative bilinear systems; control laws for certain aerospace applications; least squares parameter identification for linear and nonlinear systems; and signal reconstruction. These results are summarized for each category.

AD-A084 050/4 PC **A02**/MF **A01**
Clemson Univ SC Dept of Mathematical Sciences
Positive Dependence in Multivariate Distributions.
Technical rept.,
Khursheed Alam, and K. M. Lal Saxena. Apr 80, 19p Rept nos. N116, TR-335
Contract N00014-75-C-0451

This paper gives some new results of positive dependence between random variables which are jointly normally distributed with special reference to certain inequalities of the form P(X an element of A, Y an element of B) > or = P(X an element of A)P(Y an element of B), where A and B are given sets and X and Y are random vectors. Some results are also given on statistical dependence between quadratic forms. (Author)

ESDU-80002 PC**$578.50**
Engineering Sciences Data Unit Ltd., London (England).
The Stability and Response of Linear Systems. Part IV: Specification and Measures of System Performance.
Data item.
c1980, 33p ISBN-0-85679-284-5
For information on availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, VA. 22161.

The report is designed to assist those with limited experience in the field of analysis of dynamic systems to understand and use the various techniques available for the assessment of their stability and response; this Item, which is one of a group of six, deals with the specification and measures of system performance in the time domain and as shown by the diagrams used to assess the behavior of the system. The results may be applied to control systems analysis, stability of surface and aerospace vehicles, servomechanisms, and vibration analysis. The research is applicable to any system that can be described by linear differential equations with constant coefficients, such as many mechanical, electrical, chemical, biological, sociological, or other systems.

JINR-5-11470 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Investigation of a Class of Solutions of the Low Equation. Part 1. Small Absolute Value Solutions.
E. P. Zhidkov, M. Nguen, I. P. Nedyalkov, and B. N. Khoromskij. 1978, 14p
In Russian.
U.S. Sales Only.

Some questions of the approximate solution of the nonlinear boundary problem for analytic functions, associated with the Low equation are considered. The convergency of continuous analog of the Newton method to the solutions with small absolute value is proved. The conditions for existence and uniqueness of these solutions are obtained. The formula for the summary index of the Fresche derivative is obtained as well. (Atomindex citation 10:434273)

N80-22751/5 PC **A04**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (Germany, F.R.). Inst. fuer Strukturmechanik.
Development of Comparable Triangular Shell Finite Elements.
K. Rohwer. Apr 79, 52p DFVLR-FB-79-25

The development of ten triangular shell finite elements is described. With these elements it is possible to judge the efficiency of the discrete Kirchhoff method, the reduced integration scheme, and the reduced approximation procedure. The influence of the element curvature as well as the difference in power between a linear and a quadratic approximation are studied.

N80-23060/0 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Multi-Level Adaptive Finite Element Methods. 1: Variation Problems.
A. Brandt. 2 Mar 79, 74p NASA-TM-80985, ICASE-79-8
Contract NAS1-14101

A general numerical strategy for solving partial differential equations and other functional problems by cycling between coarser and finer levels of discretization is described. Optimal discretization schemes are provided together with very fast general solvers. It is described in terms of finite element discretizations of general nonlinear minimization problems. The basic processes (relaxation sweeps, fine-grid-to-coarse-grid transfers of residuals, coarse-to-fine interpolations of corrections) are directly and naturally determined by the objective functional and the sequence of approximation spaces. The natural processes, however, are not always optimal. Concrete examples are given and some new techniques are reviewed. Including the local truncation extrapolation and a multilevel procedure for inexpensively solving chains of many boundary value problems, such as those arising in the solution of time-dependent problems.

N80-23073/3 PC **A08**/MF **A01**
Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
Theory and Numerical Methods of Resolution of Partial Differential Equations.
P. Laval. 1979, 174p ONERA-NT-1979-2
Text in French; English Summary. Report Will Also Be Announced as Translation (Esa-TT-606).

The general properties of second order partial differential equations and of systems of higher order are discussed. The various classical boundary problems, whether hyperbolic, parabolic or elliptic, are presented in the simple case of the wave, heat, and Laplace equations with two independent variables. The numerical methods available to solve these equations are examined. The finite element method is presented within the framework of two dimensional elliptic or three dimensional parabolic problems. The finite difference methods of pseudo viscosity are presented and studied for problems of unsteady compressible flows with shock waves.

N80-23074/1 PC **A03**/MF **A01**
Stichting Mathematisch Centrum, Amsterdam (Netherlands). Dept. of Operations Research.
A Hierarchial Clustering Scheme for Asymmetric Matrices.
D. S. Bree, B. J. Lageweg, J. K. Lenstra, A. H. G. Rinnooy, and G. Vanbezouwen. May 78, 29p MC-BW-88/78
Submitted for Publication.

The problem of grouping elements, given asymmetric relationships between them, is studied. Two criteria for distinguishing between arrangements are developed: the distortion, based on the eigenvalues of the interaction matrix, and the composition, based on the amount of information lost by combining groups. The goal is to locate those arrangements in the space of the two criteria that lie close to the Pareto-optimal points. A heuristic search procedure is proposed, which allocates each element to a separate group and then combines groups is reached. The method is applied to illustrative examples and compared to other approaches.

PB80-177355 PC **E03**/MF **E03**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
On Permutations and Permutation Polytopes.
Final rept.,
H. P. Young. c1978, 29p RR-78-5
Prepared in cooperation with City Univ. of New York. Graduate School. Sponsored in part by Grant NSF-MPS75-07414.

Permutation polytopes arise in a class of problems in which the objective is to find an optimal complete ordering of some given alternatives, subject to a linear objective criterion. In this paper an easy characterization is given of neighbors on permutation polytopes. Using this characterization, it is shown that the graph of any such polytope is Hamiltonian, and that the diameter is two. The methods used are cominatorial in nature. (Copyright (c) 1978 IIASA.)

UCID-18560 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Users Manual for ILUCG.
A. I. Shestakov. Feb 80, 13p
Contract W-7405-ENG-48

The subroutine ILUCG is an iterative procedure designed to solve nonsymmetric systems arising from a nine-point discretization of partial differential equations. It combines the conjugate gradient algorithm (CG) with an incomplete L-U preconditioning of the matrix. The routine described here is optimized to run on the CRAY-1 computer, and is available on the MFE network. (ERA citation 05:017302)

12B. Operations Research

AD-A083 656/9 PC **A03**/MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Mathematics
Application of Best Linear Unbiased Prediction to Interpolation of Random Fields and to Network Design.
Technical rept.,
Andre Cabannes. Apr 80, 34p Rept no. TR-17
Contract N00014-75-C-0555

The practical problem of monitoring air pollutant concentration over a geographical area, or of estimating the mining resources in a region or a field can both be formulated as a problem of interpolation of random field. Given a real-valued random field (Z(X),x an element of R to the m power) the basic problem is to interpolate Z over an area A from measurements taken at n stations x1 ,x2,...,xn, when the distribution of Z is only partially specified. The second problem is the choice of the network of stations. After deriving the form of the best linear unbiased predictor of Z we prove a general updating theorem which is useful both practically to quicken the computation of the new estimated map, and theoretically to study the problem of network design. Then we use this theorem to prove that when Z is a smooth random field (essentially differentiable in quadratic mean) the variance of estimation error of Z(x) is a discontinuous function of the arguments x1,x2,...,xn. We discuss the practical consequences of this result in the design of networks of stations. (Author)

AD-A083 689/0 PC **A04**/MF **A01**
George Washington Univ Washington DC Program in Logistics
Sensitivity Analysis of a Nonlinear Structural Design Problem.
Scientific rept.,
Anthony V. Fiacco, and Abolfazl Ghaemi. 24 Jan 80, 64p Rept no. SERIAL-T-413
Contract N00014-75-C-0729

This paper presents a user-oriented demonstration of practical applicability of a recently developed sensitivity analysis methodology. The required underlying theory for sensitivity analysis of nonlinear programming problems and an algorithm for implementing the subsequent results of this theory using the Sequential Unconstrained Minimization Technique are briefly reviewed. A recently developed computer program based on this approach is used to conduct a sensitivity analysis of a nonlinear programming problem associated with the optimization of the design of a vertically corrugated transverse bulkhead of an oil tanker. Major assumptions and results associated with the basic sensitivity analysis approach are verified for the subject problem. First order sensitivity information is used to estimate measures associated with various perturbations of the given problem data. Details of stability and convergence characteristics of the solution points and their partial derivatives with respect to the problem parameters are amply tabulated and graphically illustrated. (Author)

AD-A083 707/0 PC **A08**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
LPAFIT, An Interactive Linear Programming Package Developed at the Air Force Institute of Technology.
Master's thesis,
Michael A. Schiefer. Dec 79, 171p Rept no. AFIT/GOR/SM/79D-7

This thesis effort produced a linear programming package, called LPAFIT. Two Fortran programs were written. The first, LPSOLVE, solves linear programming problems using the simplex method. It allows a user to do interactive sensitivity analyses. The second program, LPFRONT, is a preprocessor for LPSOLVE. LPFRONT assists the user in creating the input for LPSOLVE. A procedure controls all file manipulations. The only thing the user must be able to do is to express a problem in terms of a constrained objective function. Both programs are currently formatted to process up to 99 decision variables and 99 constraints. The routines will not solve integer or mixed integer problems. The package runs on a CDC 6600. (Author)

AD-A083 734/4 PC **A03**/MF **A01**
Maryland Univ College Park Computer Science Center
The Effect of the Future in Work Distribution.
Technical rept.,
Glenn Ricart, and Ashok K. Agrawala. Feb 80, 29p CSC-TR-868, AFOSR-TR-80-0310
Grant AFOSR-78-3654

A controller is considered which routes arrivals among several servers of different speeds. A decision which sends work to the server which will complete it soonest does not optimize the average completion time (mean flow time) because it doesn't take into account the impact of the decision on future arrivals. This impact on future arrivals, the 'future effect', can be significant at high arrival rates. An estimate of the size of the future effect is derived and controllers which take it into account in routing decisions can reduce the average completion time to near optimum. The effect is most pronounced when the service requirements for arrivals are nearly constant, server speeds are markedly different, and the arrival rate is close to the system's capacity. A controller considering the future effect will more heavily weigh a potential server's backlog than the arrival's service time when making a routing decision. (Author)

AD-A083 782/3 PC **A02**/MF **A01**
Maryland Univ College Park Computer Science Center
On an Exponential Server with General Cyclic Arrivals.
Technical rept.,
Ashok K. Agrawala, and Satish K. Tripathi. Feb 80, 25p CSC-TR-867, AFOSR-TR-80-0311
Grant AFOSR-78-3654

A G(superscript n)/M/1 queue is defined as a single server queue with exponential service time and general cyclic arrival distributions of cycle length n. The waiting time distribution for such a queue is proved to be a sum of n exponential terms; this is a generalization of g/M/1 queue results. Based on this a method for obtaining the steady-state waiting time distributions for G(superscript n)/M/1 queues is introduced. An example is presented to show an application of G(superscript n)/M/1 queues in deterministic routing. (Author)

AD-A083 816/9 PC **A02**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Optimal Simplex Tableau Characterization of Unique and Bounded Solutions of Linear Programs.
Technical summary rept.,
O. L. Mangasarian. Jan 80, 20p Rept no. MRC-TSR-2034
Contract DAAG29-75-C-0024, Grant NSF-MCS79-01066

Uniqueness and boundedness of solutions of linear programs are characterized in terms of an optimal simplex tableau. Let M denote the submatrix in an optimal simplex tableau with columns corresponding to degenerate optimal dual basic variables. A primal optimal solution is unique if and only if there exists a nonvacuous nonnegative linear combination of the rows of M corresponding to degenerate optimal primal basic variables which is positive. The set of primal optimal solutions is bounded if and only if there exists a nonnegative linear combination of the rows of M which is positive. When M is empty the primal optimal solution is unique. (Author)

AD-A083 827/6 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
On Homogeneity and On-Line-Off-Line Behavior in M/G/1 Queueing Systems.
Technical summary rept.,
Raymond M. Bryant. Feb 80, 42p Rept no. MRC-TSR-2045
Contract DAAG29-75-C-0024

Operational analysis replaces certain classical queueing theory assumptions with the conditions of 'homogeneous service times' and 'on-line=off-line behavior.' In the general case, it has been conjectured that these conditions hold as t-->infinity only if the service times are exponentially distributed. In this paper, we show that this is correct for stable M/G/1 queueing systems. We also state dual results for inter-arrival times in G/M/1. Finally, we consider the relationship between the operational quantities S(n) and the mean service time in M/G/1. This relationship is shown to depend on the form of the service time distribution. It follows that using operational analysis to predict the performance of an M/G/1 queueing system will be most successful when the service time is exponential. Simulation evidence is presented which supports this claim. (Author)

AD-A083 894/6 PC **A03**/MF **A01**
Virginia Polytechnic Inst and State Univ Blacksburg
Multicharacteristic Quality Control: A Survey.
Research rept.,

P. M. Ghare, Y. V. Hui, and D. R. Jensen. Mar 80, 26p ARO-15194.5-M
Grant DAAG29-78-G-0172

Multicharacteristic quality control is concerned with inspecting the quality of an allotment of items and with monitoring production processes when the quality of an item or the state of a process is determined by a number of observable characteristics. This report reviews procedures currently available for multicharacteristic quality control when the characteristics are either variables or attributes. Attention is given to both location and dispersion parameters in the case of variables. Some limitations of these procedures are noted. (Author)

AD-A084 021/5 PC **A02**/MF **A01**
Stanford Univ CA Dept of Computer Science
Gossiping Without Duplicate Transmissions.
Technical rept.,
Douglas B. West. Aug 79, 8p Rept no. STAN-CS-79-761
Contracts N00014-76-C-0330, N00014-76-C-0688
Sponsored in part by Grant NSF-MCS77-23738.

N people have distinct bits of information, which they communicate via telephone calls in which they transmit everything they know. We require that no one ever hear the same piece of information twice. In the case 4 divides n, n > or = 8, we provide a construction that transmits all information using only 9n/4-6 calls. Previous construction used 1/2n log n calls. (Author)

DOE/ER/05046-16 PC **A03**/MF **A01**
Rice Univ., Houston, TX. Dept. of Mathematical Sciences.
Augmented Lagrangian Methods for Constrained Optimization: The Role of the Penalty Constant.
R. A. Tapia. 1979, 33p CONF-7906140-2
Contract EY-76-S-05-5046
Conference on nonlinear optimization and applications, L'Aquila, Italy, 18 Jun 1979.

In recent years there has been considerable research activity in the area of penalty function and augmented Lagrangian methods for constrained optimization. The role that the penalty constant plays with respect to local convergence and rate of convergence is reviewed here. As the emphasis has changed from the penalty function methods to the multiplier methods, and lately to the quasi-Newton methods, there has been a corresponding decrease in the importance of the penalty constant. Specifically, in the penalty function method one obtains local convergence if and only if the penalty constant becomes infinite. It is possible to obtain local convergence in the multiplier method for a fixed penalty constant, provided that this constant is sufficiently large. However, one obtains superlinear convergence if and only if the penalty constant becomes infinite. Finally, the quasi-Newton methods are locally superlinearly convergent for fixed values of the penalty constant, and actually the most natural formulation gives an algorithm that is independent of the penalty constant. (ERA citation 05:017285)

PB80-176829 PC **E02**/MF **E02**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
A Tactical Lobbying Game.
Final rept.,
H. P. Young. c1978, 19p RR-78-10
Grant NSF-MCS77-03648
Prepared in cooperation with City Univ. of New York. Graduate School.

Some basic solution properties and anomalies are investigated for a class of tactical games related to so-called Colonel Blotto games. In this model two agents compete for control of players in a given n-person simple game. It is shown that equilibrium solutions do not always exist. The case where the opponents have substantially unequal resources is solved. Some approximate values for particular cases where resources are equal are also cited.

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

AD-A083 662/7 PC **A03**/MF **A01**
Army Facilities Engineering Support Agency Fort Belvoir VA Technology Support Div
Energy Saving in Electric Lighting for the United States Army.
Final rept.,
Alan J. Van den Berg. 5 Oct 79, 46p Rept no. USAFESA-TS-2077

The Facilities Engineer has been required to lower the electric usage on his Post. With the advent of the conservation program came more and more products with potentially high energy savings usually accompanied by pressures to buy the devices. Some of the devices have a definite use and place in the lighting world but none of them is without tradeoffs of some sort or other. This report is designed to augment OCE Technical Note 77-2. It is hoped that it will help the Facilities Engineer recognize and appreciate the tradeoffs of some useful devices, and to make simpler the task of devising a good lighting plan.

AD-A084 061/1 PC **A03**/MF **A01**
ITT Electron Tube Div Easton PA
Low Voltage Ignition Sealed Beam Xenon Lamp.
Final rept. 1 Oct 76-1 Oct 79,
H. C. Grunwald. 1 Nov 79, 43p ITT-1056.15, DELNV-76-0261-F
Contract DAAK70-76-C-0261

The task was to modify an existing 1.0 Kilowatt sealed beam lamp from the standard high voltage pulse starting to a low voltage mechanical starting arrangement. Problems in the lamp development were met and solved. The program was not successful because of problems encountered with the associated circuitry which was developed elsewhere. It was also concluded that the lamp design was marginal. Suggestions for a different approach to the problem are given. (Author)

ANL/CNSV-TM-23 PC **A18**/MF **A01**
Georgia Tech. Research Inst., Atlanta.
Heat Pump Centered Integrated Community Energy Systems: System Development. Georgia Institute of Technology Final Report.
D. W. Wade, B. C. Trammell, B. S. Dixit, D. C. McCurry, and B. A. Rindt. Dec 79, 422p
Contract W-31-109-ENG-38

Heat Pump Centered-Integrated Community Energy Systems (HP-ICES) show the promise of utilizing low-grade thermal energy for low-quality energy requirements such as space heating and cooling. The Heat Pump - Wastewater Heat Recovery (HP-WHR) scheme is one approach to an HP-ICES that proposes to reclaim low-grade thermal energy from a community's wastewater effluent. This report develops the concept of an HP-WHR system, evaluates the potential performance and economics of such a system, and examines the potential for application. A thermodynamic performance analysis of a hypothetical system projects an overall system Coefficient of Performance (C.O.P.) of from 2.181 to 2.264 for waste-water temperatures varying from 50 exp 0 F to 80 exp 0 F. Primary energy source savings from the nationwide implementation of this system is projected to be 6.0 QUADS-fuel oil, or 8.5 QUADS - natural gas, or 29.7 QUADS - coal for the period 1980 to 2000, depending upon the type and mix of conventional space conditioning systems which could be displaced with the HP-WHR system. Site-specific HP-WHR system designs are presented for two application communities in Georgia. Performance analyses for these systems project annual cycle system C.O.P.'s of 2.049 and 2.519. Economic analysis on the basis of a life cycle cost comparison shows one site-specific system design to be cost competitive in the immediate market with conventional residential and light commercial HVAC systems. The second site-specific system design is shown through a similar economic analysis to be more costly than conventional systems due mainly to the current low energy costs for natural gas. It is anticipated that, as energy costs escalate, this HP-WHR system will also approach the threshold of economic viability. (ERA citation 05:013812)

ANL-CT-80-3 PC **A05**/MF **A01**
Argonne National Lab., IL.
DOE/ANL/HTRI Heat Exchanger Tube Vibration Data Bank.
H. Halle, J. M. Chenoweth, and M. W. Wambsganss. Feb 80, 77p
Contract W-31-109-ENG-38

Development of a new heat exchanger tube vibration data bank at Argonne National Laboratory is described. Comprehensive case histories on heat exchangers that have experienced tube-vibration problems and units that have been trouble-free are accumulated and this information is rendered available for evaluation, improvement, and development of vibration-prediction methods and design guidelines. Discussions include difficulties in generating a data bank, data form development, and solicitation efforts. Also included are 15 case histories upon which the data bank will be built. As new case histories are received, they will be assembled and published as addenda to this report. (ERA citation 05:016284)

CONF-791022-13 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Solar Energy Lab.
Resistance Network Design Method for Passive Solar Systems.
W. A. Monsen, S. A. Klein, W. A. Beckman, and D. M. Utzinger. 1979, 5p
Contract EY-76-S-02-2588
National passive solar energy conference, Kansas City, KS, USA, 3 Oct 1979.

A general, computationally simple design method has been developed to compute the monthly average fraction of the space heating load supplied by either a thermal storage wall or a direct gain system. Existing design methods for these systems were developed by curve-fitting the results of computer simulations for a set of specific reference systems. The method described is based on a more fundamental approach and, as a result, is less restrictive. The effects on system performance of parameters such as the number and type of glazings, the thickness and heat transfer properties of the thermal wall, and nighttime insulation can be accounted for. The results from this method agree to within approximately three per cent on an annual basis with hour-by-hour simulations. (ERA citation 05:015367)

CONF-800103-3 PC **A02**/MF **A01**
Argonne National Lab., IL.
Application of Reliability, Maintainability, and Availability Engineering to Solar Heating and Cooling Systems.
P. S. Chopra, and R. M. Wolosewicz. 1980, 7p
Contract W-31-109-ENG-38
Reliability and maintainability symposium, San Francisco, CA, USA, 22 Jan 1980.

The reliability of solar hot-water and heating systems is compared with that of conventional systems using block diagrams, failure modes and effects analysis, and fault trees. Although stand-alone solar-energy systems are not as reliable as conventional systems, the RMA of the combined solar and conventional system can be made comparable to currently available heating and hot-water systems. An availability matrix is presented that can be used to develop maintenance schedules that do not decrease the system's availability. Field data presented on operating solar heating and cooling systems indicate that these systems experience four major generic problems: freezing, leakage, controls, and collectors. (ERA citation 05:015369)

COO-4977/1(V.2) PC **A13**/MF **A01**
Public Service Electric and Gas Co., Newark, NJ.
District Heating and Cooling Systems for Communities Through Power Plant Retrofit Distribution Network. Final Report, September 1, 1978-May 31, 1979.
Oct 79, 293p
Contract EM-78-C-02-4977

This Final Report (Volume 2) of Phase 1 of District Heating for Communities Through Power Plant

Retrofit Distribution Network contains 3 tasks: (1) Demonstration Team; (2) Identify Thermal Energy Sources and Potential Service Areas; and (3) Energy Market Analysis. Task 2 consists of estimating the thermal load within 5 and 10 miles of Public Service Electric and Gas Company steam power plants, Newark, New Jersey; estimating the costs of supplying thermal services to thermal loads of varying densities; a best case economic analysis of district heating for single-family homes; and some general comments on district-heating system design and development. Task 3 established the potential market for district heating that exists within a 5-mile radius of the selected generating stations; a sample of the questionnaire sent to the customers are shown. (ERA citation 05:016094)

COO-4979-1(V.4) PC **A06**/MF **A01**
Toledo Edison Co., OH.
District Heating and Cooling Systems for Communities Through Power Plant Retrofit and Distribution Network. Volume 4. Tasks 7-9. Final Report.
J. R. Watt, and G. A. Sommerfield. Aug 79, 113p
Contract EM-78-C-02-4979

In Task 7, Proposal for Further Work, it is concluded that the combination of the Acme Station, a coal-fired station, and the downtown Toledo area will serve as a successful Demonstration Project. The existing steam system can serve as an excellent base from which various expansion plans can be derived. Replacing the steam system with a coal-fired cogeneration source provides an excellent opportunity for scarce fuel savings. The engineering consultant recommended the installation of a back-pressure turbine as the best method of obtaining cogeneration steam. Task 7 concludes with the site-specific Scope of Work to address the requirements of Phases 2 and 3. Approval is being sought for both phases. Letters of cooperation and commitment are displayed in Task 8. A detailed work management plan is described in Task 9. Information on the demonstration team members is included. (ERA citation 05:016097)

DOE/CS-0133 PC **A07**/MF **A01**
Federal Energy Management Program, Washington, DC.
Identifying Retrofit Projects for Buildings.
Feb 80, 142p

This document was prepared as a guide to Federal field personnel in identifying building retrofit projects with early returns on investments. The method in the handbook involves small Federal buildings that do not have complex mechanical and electrical systems. It is also applicable to those larger and more complex buildings, where, due to other priorities, a complete professional architectural and engineering survey has not been scheduled and either interim conservation measures are sought or the relative potential of the building for such a detailed survey is being assessed. The survey involves 4 steps: collecting energy use data; categorizing buildings; identifying retrofit options; and evaluating and ranking retrofit projects. Details of the tasks in each step are discussed. (ERA citation 05:016010)

DOE/CS/30277-T1 PC **A03**/MF **A01**
National Center for Appropriate Technology, Butte, MT.
Plan for the Performance Monitoring of Solar Systems Installed by the SUIEDE Program: NCAT/SUEDE Interaction.
M. Hopkins. Feb 79, 35p
Contract FG01-79CS30277

The SUEDE Grantee solar system installation programs were reviewed to determine the type, number, and quality of Grantee-installed solar systems available for monitoring consideration. An NCAT Performance Monitoring Plan is presented which identifies the service and technical assistance that NCAT will need to provide based on the Grantee review. (ERA citation 05:015377)

DOE/CS/34153-1 PC **A02**/MF **A01**
Living Systems, Winters, CA.
Cool Pool Development. Quarterly Technical Report No. 1, April-June 1979.
K. Crowther. 15 Oct 79, 12p
Contract EG-77-G-04-4153

The Cool Pool is a passive cooling system consisting of a shaded, evaporating roof pond which thermosiphons cool water into water-filled, metal columns (culvert pipes) located within the building living space. The water in the roof pond is cooled by evaporation, convection and radiation. Because the water in the pool and downcomer is colder and denser than the water in the column a pressure difference is created and the cold water flows from the pool, through the downcomer and into the bottom of the column. The warm column water rises and flows through a connecting pipe into the pool. It is then cooled and the cycle repeats itself. The system requires no pumps. The water column absorbs heat from the building interior primarily by convection and radiation. Since the column is radiating at a significantly lower temperature than the interior walls it plays a double role in human comfort. Not only does it cool the air by convection but it provides a heat sink to which people can radiate. Since thermal radiation is important to the cooling of people, the cold water column contributes substantially to their feelings of comfort. Research on the Cool Pool system includes the following major tasks: control of biological organisms and debris in the roof pond and water cylinders; development of a heat exchanger; experimental investigation of the system's thermal performance; and development of a predictive computer simulation of the Cool Pool. Progress in these tasks is reported. (ERA citation 05:015988)

DOE/CS/34153-2 PC **A03**/MF **A01**
Living Systems, Winters, CA.
Cool Pool Development. Quarterly Technical Report No. 2, June-December 1979.
K. Crowther. 5 Jan 80, 42p
Contract EG-77-G-04-4153

The Cool Pool is a variation of the evaporating roof pond idea. The pool is isolated from the living space and the cooled pond water thermosiphons into the water columns located within the building. A computer model of the Cool Pool and the various heat and mass transfer mechanisms involved in the system are discussed. Theory will be compared to experimental data collected from a Cool Pool test building. (ERA citation 05:015378)

EGG-FM-5087 PC **A03**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Short-Term Pilot Cooling Tower Tests.
D. F. Suciu, and R. L. Miller. Jan 80, 47p
Contract EY-76-C-07-1570

Two major problems are associated with the use of cooled geothermal water as coolant for the 5 MW(e) pilot plant at Raft River. They are: (1) a scaling potential owing to the chemical species present in solution, and (2) the corrosive nature of the geothermal water. Tests were conducted to obtain data so that methods can be devised to either reduce or eliminate effects from these problems. Data show that scaling can be prevented, but only by using a high concentration of dispersant. Pitting data, however, are not as conclusive and seem to indicate that pitting control cannot be realized, but this result cannot be substantiated without additional experimentation. Results also demonstrate that chromate can be removed by using either chemical destruction or ion exchange. Whichever method is used, EPA discharge limits for both chromate and zinc can be achieved. A preliminary economic analysis is presented. (ERA citation 05:017639)

FE-2556-26 PC **A03**/MF **A01**
Solar Turbines International, San Diego, CA.
Development of a Ceramic Tube Heat Exchanger with Relaxing Joint. Quarterly Technical Progress Report, April 1-June 30, 1979.
M. E. Ward, M. E. Gulden, N. G. Solomon, and A. G. Metcalfe. 15 Jul 79, 33p
Contract EF-77-C-01-2556

Ceramic tubes from the environmental tests have been examined and analyzed. Both NC-430 and Super KT SiC exhibited no significant change in structure, and minor dimensional change after the 1000 hour exposure. A reduction in tube thickness at the leading edge occurred with the alpha-sintered SiC tubes. The probable cause of material loss of the tubes is accelerated oxidation due to impingement of contaminants which acted to fracture, dissolve and wash away the normally pure silica protective layer that forms on the carbide. No structural or dimensional changes were observed for any of the tube materials after the 100 hour test with V sub 2 O sub 5 contaminant. Test module construction continued with the grinding of the eight foot tubes and brazing of the tube segments to form 15 foot long tubes. Forty-six eight-foot long tubes have been received. (ERA citation 05:016184)

LBL-10117 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
In-Situ Measurements of Residential Energy Performance Using Electric CO-Heating.
R. C. Sonderegger, P. E. Condon, and M. P. Modera. Jan 80, 22p CONF-800206-4
Contract W-7405-ENG-48
American Society of Heating, Refrigeration, and Air Conditioning Engineers semi-annual meeting, Los Angeles, CA, USA, 3 Feb 1980.

An experimental technique is presented, called electric co-heating, for measuring the net efficiency of heating and cooling systems in residential buildings. In this technique, constant temperature is maintained inside the test building by thermostated, portable electric heaters. The net heat gain from any heating system in the building is measured by the reduction in electric heating needed to maintain constant indoor temperature. The method is illustrated with actual efficiency tests of a central gas fired heating system, an open fireplace, and a central air conditioner. Other capabilities of the electric co-heating technique illustrated here are the measurement of heat load caused by air infiltration and the measurement of an equivalent conductance of the building envelope. The in-situ characteristic of the method is stressed: actual, net heat gains, and cooling and heating loads are measured, reflecting the interaction between the tested appliance and the building containing it. In this context heating efficiency improvements of a heating system can be measured whether they stem from bettered combustion efficiency or from insulation of heating ducts. (ERA citation 05:017798)

LBL-10352 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Experimental Test Facility for Evaluation of Controls and Control Strategies.
M. L. Warren, S. R. Schiller, and M. Wahlig. Jan 80, 16p CONF-800101-14
Contract W-7405-ENG-48
Systems simulation and economics analysis conference, San Diego, CA, USA, 23 Jan 1980.

An experimental test facility has been constructed to evaluate the operation and performance of controls for active hydronic solar energy systems. The experimental system serves to test the relative performance of different controllers and alternative control algorithms for a variety of input meteorological conditions and output load demands. The experimental system consists of a collector loop heat input simulator, a storage tank, a load loop air channel with fan coil, an auxiliary heat source, and associated pumps and valves. The heat input simulator, the pseudo-collector, consists of a boiler with a controlled mixing valve that allows precise adjustment of the heat input from the collectors based on predictions of a collector loop model using solar and weather data. An automated air flow channel has been constructed to simulate the building return airflow across the heating coil in the furnace ductwork for a residential system. A single zone building load model is used to predict building energy requirements and to simulate the demand thermostat. Only the apparent temperature of the collector and the demand thermostat condition are simulated, enabling control strategy and equipment comparisons based on identical load conditions. The test facility is instrumented with thermocouples and turbine flow meters. Data acquisition is accomplished using a one hundred channel DORIC data logger. Data acquisition, experiment control, and the load and pseudo-collector models are under control of a HP 9825A microcomputer using flexible disks for data and program storage. (ERA citation 05:017545)

N80-22635/0 PC **A02**/MF **A01**
B & K Engineering, Inc., Towson, MD.

Long Term Tests of the HEPP Liquid Trap Diode Heat Pipe Prototype.
Final Report.
Apr 80, 11p NASA-CR-152358, BKO67-1004
Contract NAS2-10203

The test results which were obtained with the HEPP liquid trap diode heat pipe prototype after it had been in storage for almost 27 months are presented. Transport data were obtained over the range of 150 to 220 K and reverse mode shutdown was measured with nominal operation at 180 K.

N80-22774/7 PC **A08**/MF **A01**
Florida Solar Energy Center, Cape Canaveral.
Solar Heating and Cooling Demonstration Project at the Florida Solar Energy Center.
Final Report.
Feb 80, 175p NASA-CR-161413
Contract EG-77-A-01-4074
Sponsored in Part by NASA.

The retrofitted solar heating and cooling system installed at the Florida Solar Energy Center is described. The system was designed to supply approximately 70 percent of the annual cooling and 100 percent of the heating load. The project provides unique high temperature, nonimaging, nontracking, evacuated tube collectors. The design of the system was kept simple and employs five hydronic loops. They are energy collection, chilled water production, space cooling, space heating and energy rejection. Information is provided on the system's acceptance test results operation, controls, hardware and installation, including detailed drawings.

N80-22781/2 PC **A07**/MF **A01**
Interactive Resources, Inc., Point Richmond, CA.
Solar Process Water Heat for the Iris Images Custom Color Photo Lab.
Final Report.
Mar 80, 126p NASA-CR-161414
Contract EX-76-C-01-2381
Sponsored by NASA. Marshall Space Flight Center.

The solar facility located at a custom photo laboratory in Mill Valley, California is described. It was designed to provide 59 percent of the hot water requirements for developing photographic film and domestic hot water use. The design load is to provide 6 gallons of hot water per minute for 8 hours per working day at 100 F. It has 640 square feet of flat plate collectors and 360 gallons of hot water storage. The auxillary back up system is a conventional gas-fired water heater. Site and building description, subsystem description, as-built drawings, cost breakdown and analysis, performance analysis, lessons learned, and the operation and maintenance manual are presented.

SOLAR/0904-79/70 PC **A03**/MF **A01**
Argonne National Lab., IL.
Influence of Solar Fluid Properties on Thermal Performance Based on Nominal and Measured Values.
C. F. Cheng, H. Singh, and P. S. Chopra. May 79, 37p ANL/SDP-TM-79-6
Contract W-31-109-ENG-38

Frequently, the fluids that are actually used in solar energy systems are not of the same concentration as those specified in the design. When fluid concentrations vary, the quality of thermal performance varies as well. This report is a preliminary assessment of the effect on thermal performance of variations in the characteristics of solar fluids. Inhibited ethylene and propylene glycol/water antifreeze solutions were collected from seven instrumented sites when these sites became operational. The specific heat and density of these fluids were measured at three temperatures. The daily thermal performance of each site for the month of November 1978 was calculated using design and measured values. Deviations of up to 20 percent were observed in antifreeze concentrations, resulting in deviations in thermal performance and collector array efficiency of up to 8 percent. (ERA citation 05:015398)

UCRL-15194 MF **A01**
Kaiser Engineers, Inc., Oakland, CA.
Site and Building Energy-Conservation Study: Survey of Building 113, Theoretical and Computation.
Oct 79, 1p
Contract W-7405-ENG-48
Portions of document are illegible.
Microfiche copies only.

An energy-conservation study of Building 113, Theoretical and Computation, at LLL was made. The survey of Building 113 was based on a review of the design drawings, an on-site inspection of the 88,700-ft exp 2 building, and discussions with the building manager and various operating personnel. Data were collected regarding the number of people occupying the building, operating schedules, and the energy loads imposed by installed and temporary equipment. The HVAC systems were investigated. The building energy systems were simulated using the DOE-1 energy program. A base-year energy-consumption run was made, together with simulations of the building's performance assuming installation of each of six energy-conservation opportunities (ECO's) identified. A summary of the energy savings that would result from implementation of the ECO's is presented. (ERA citation 05:017801)

UCRL-15195 MF **A01**
Kaiser Engineers, Inc., Oakland, CA.
Site and Building Energy-Conservation Study: Survey of Building III, Experimental Physics.
Oct 79, 1p
Contract W-7405-ENG-48
Portions of document are illegible.
Microfiche copies only.

An energy-conservation study of Building III, Experimental Physics, at LLL was conducted. The survey was based on a detailed review of the as-built drawings, an on-site inspection of the 100,000-ft exp 2 building, and discussions with the building manager and various operating personnel. Data were collected regarding the number of people occupying the building, operating schedules, and the energy loads imposed by installed and temporary equipment. The HVAC systems were investigated. The building energy systems were simulated using the DOE-1 energy program. A base-year energy-consumption run was made, together with simulations of the building's performance assuming installation of each of nine energy conservation opportunities (ECO's) and combinations identified. A summary of the energy savings resulting from the implementation of the ECO's is presented. (ERA citation 05:017802)

UCRL-15197 PC **A02**/MF **A01**
Kaiser Engineers, Inc., Oakland, CA.
Site and Building Energy-Conservation Study: Task II - Building Selection Study.
May 79, 22p
Contract W-7405-ENG-48

The principal objectives of this study were to determine the current site and building energy usage and to identify energy-conservation opportunities at LLL. This report presents the results of Task II - Building Selection Study. The objectives of Task II were to evaluate all of the 114 permanent buildings at LLL and to select several representative buildings for detailed building energy studies performed during Task III. These detailed studies, in turn, will provide building energy-consumption data for use in the Task I - Site Energy Study. The site and building energy systems are being simulated in Tasks I and III using the DOE - 1 program which permits the evaluation of the proposed energy-conservation opportunities (ECO's) in terms of both energy and cost savings. (ERA citation 05:017803)

UCRL-15198 MF **A01**
Kaiser Engineers, Inc., Oakland, CA.
Site and Building Energy-Conservation Study: Survey of Building 435, MFE Research.
Oct 79, 1p
Contract W-7405-ENG-48
Portions of document are illegible.
Microfiche copies only.

An energy-conservation study of Building 435, Magnetic Fusion Energy Research, at LLL was conducted. It was based on a review of the design drawings, an on-site inspection of the 49,700-ft exp 2 building, and discussions with the building manager and various operating personnel. Data were collected regarding the number of people occupying the building, operating schedules, and the energy loads imposed by installed and temporary equipment. The HVAC systems were investigated. The building energy systems were simulated using the DOE-1 energy program. A base-year energy consumption run was made, together with simulations of the building's performance assuming installation of each of eleven energy-conservation opportunities (ECO's) identified. A summary of the energy savings that would results from implementation of the ECO's is given. (ERA citation 05:017804)

UEC-S-030/78 PC **A02**/MF **A01**
Universidade Estadual de Campinas (Brazil). Inst. de Fisica.
Forarco I.
B. J. Holt, J. V. Diaz, and C. A. Luengo. 1978, 10p
In Portuguese.
U.S. Sales Only.

An arc furnace built at UNICAMP is described. In this equipment it is possible to melt pure metal or alloys with melting points up to 3000 exp 0 C in quantities up to 20 grs. The melting is carried out in an inert atmosphere (Argon or Helium) to prevent oxidation. Emphasis is given to the use of materials available at the Brazilian market so that few imported components are needed. (Atomindex citation 10:481777)

13B. Civil Engineering

AD-A083 631/2 PC **A05**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Geotechnical Lab
Geotechnical Containment Alternatives for Industrial Waste Basin F, Rocky Mountain Arsenal, Denver, Colorado. A quantitative Evaluation.
Final rept. 1 Dec 77-30 Sep 78,
Samuel P. Miller. Sep 79, 96p Rept no. WES/TR/GL-79-23
Contract IAO-RM-56-78

Rocky Mountain Arsenal (RMA), since its establishment in 1942, has produced chemical, biological, and incendiary munitions and destroyed chemical munitions. Additionally, private corporations have used leased facilities at the Arsenal for pesticide production. Wastes from these operations have been placed in several basins at RMA. Discovery of off-post contamination led to Cease and Desist Orders from the state of Colorado, which required that off-post contamination by two organic substances cease. As a result of these orders and a continuing program to contain and treat migrating wastes and to identify, isolate, and treat pollution sources contributing to this migration, one of the waste basins, Basin F, was studied. The principal tasks of the study were to develop the geohydrologic setting in te area of the basin, select feasible containment alternatives, determine the effect of basin wastes on the construction materials of each alternative, recommend one alternative, and provide a conceptual design of the containment system and a monitoring system.

AD-A083 632/0 PC **A03**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS Hydraulics Lab
Selective Withdrawal Riser for Sutton Dam, West Virginia. Hydraulic Model Investigation.
Final rept. 12 Aug 77-20 Oct 78,
John F. George, Mark S. Dortch, and Charles H. Tate, Jr. Mar 80, 46p Rept no. WES/TR/HL-80-4

A 1:20-scale physical model was used to determine the hydraulic adequacy of the proposed design including discharge characteristics, pressure conditions, and essential operational guidance. The model reproduced a 16-ft-radius semicircular riser with trashrack, a 120-ft-wide section of Sutton Dam, the entire length of one sluice including its bell-mouthed intake, the intake gate and the flip bucket downstream of the sluice. With the initial riser tested in this model the top of the riser was set at el 910 and the invert at el 810. Very unstable flow conditions were observed for all discharges greater than 800 cfs. Vortices and vapor cavities, sufficient for severe cavitation damage, were observed immediately upstream of the sluice intake and resulted in significant fluctuations of pressures in the bell-mouthed intake for the major-

ity of flow conditions. Recommended modifications (type 5 design) incorporated into the original design included raising the riser invert to el 825 and placing a 2V-on-1H fillet on the riser invert. These modifications streamlined flow conditions into the sluice which eliminated the vortices and vapor cavities that formed upstream of the sluice intake with the original design and reduced pressure fluctuations in the bell-mouthed intake to a minimum.

AD-A083 745/0 MF A01
Baker (Michael) Jr Inc Beaver PA
National Dam Inspection Program, Big Beaver Dam (Pa No Name Number 14, NDI Number PA 00258, PennDER Number 4-11), Ohio River Basin, Tributary of Clark's Run, Beaver County, Pennsylvania. Phase I Inspection Report,
John A. Dziubek. Feb 80, 78p
Contract DACW31-80-C-0025
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Big Beaver Dam is an earth embankment with a maximum height of 25 feet and a total length of 320 feet. The spillway, located at the right abutment, consists of a cut stone lined broad crested weir and chute. The spillway crest is 9.6 feet long perpendicular to the flow and 12 feet long parallel to the flow. The chute has an overall width of 10 feet and a length of 75 feet; the spillway crest is located 3.5 feet below the low spot of the crest of the dam. The outlet works for the dam consist of an 8 inch cast-iron pipe with the upstream end submerged approximately 30 feet out from the center line of the dam. The dam was found to be in fair overall condition at the time of inspection. The spillway will pass approximately 37 percent of the Probable Maximum Flood (PMF) before overtopping will occur.

AD-A083 746/8 MF A01
Kimball (L Robert) and Associates Ebensburg PA
National Dam Inspection Program. Raven Run Dam Number 2 (NDS ID Number PA-663 DER ID Number 54-7) Susquehanna River Basin, Lost Creek, Schuylkill County, Pennsylvania. Phase I Inspection Report,
R. Jeffrey Kimball. Mar 80, 66p
Contract DACW31-80-C-0020
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Raven Run Dam No. 2 is an earth and rockfill dam, 462 feet long and 37 feet high. The crest width of the dam is 8 feet. The spillway is located on the right abutment and consists of a rectangular shaped weir formed by stone masonry walls on both sides. The weir is 60 feet long. The spillway exit channel discharges on the right hillside below the toe of dam. The outlet conduit consists of a 24 inch or a 36 inch cast iron pipe under the earth embankment. Upstream of Raven Run Dam No. 2 is Raven Run Dam No. 3. All flows from Raven Run Dam No. 3 discharge into Raven Run No. 2 Reservoir. The spillway and reservoir are capable of controlling the PMF. Based on criteria established by the Corps of Engineers, the spillway is termed adequate. The seepage exiting below the toe of the dam should be monitored at regular intervals. In addition, a subsidence investigation should be conducted to determine the effects of past and present mining beneath the structure.

AD-A083 747/6 MF A01
Kimball (L Robert) and Associates Ebensburg PA
National Dam Inspection Program. Kehly Run Dam Number 3 (NDS ID Number PA-657 DER ID Number 54-17) Susquehanna River Basin, Kehly Run, Schuylkill County, Pennsylvania. Phase I Inspection Report,
R. Jeffrey Kimball. Mar 80, 97p
Contract DACW31-80-C-0020
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Kehly Run Dam No. 3 is an earth and rockfill dam 442 feet long and approximately 33 feet high. The spillway is an open cut channel located on the left abutment. The spillway crest has a total length of 35 feet and has an irregular bottom. Immediately downstream of Kehly Run Dam No. 3 is a swimming pool which forms tailwater on the dam. This swimming pool is formerly Kehly Run Dam No. 2. Upstream of Kehly Run Dam No. 3 are three reservoirs (Kehly Run Dams No. 4, 5, 6). Kehly Run Dam No. 3 appears to be in fair condition. Several areas of 'possible past instability' are apparent on the downstream slope. In addition, extensive seepage areas have been reported in the past but may be obscured by the tailwater. Maintenance of the dam and operating facilities is considered poor. The spillway design flood is the PMF (probable maximum flood). The spillway and reservoir are capable of controlling approximately 17% of the PMF without overtopping the embankment.

AD-A083 748/4 MF A01
Kimball (L Robert) and Associates Ebensburg PA
National Dam Inspection Program. Kehly Run Dam Number 5 (NDS ID Number PA-658 DER ID Number 54-7) Susquehanna River Basin, Kehly Run, Schuylkill County, Pennsylvania. Phase I Inspection Report,
R. Jeffrey Kimball. Mar 80, 69p
Contract DACW31-80-C-0080
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Kehly Run Dam No. 5 is an earthfill dam which is semi-circular in plan and convex in the downstream direction. The embankment is 1,050 feet long and 25 feet high. The crest width varies from 15 feet to 25 feet wide. The lower part of the downstream slope of the embankment consists of hand placed stone. The upper portion of the downstream slope consists of an earthfill. The reservoir drain conduit consists of one 6-inch cast iron pipe. The spillway is located on the left abutment and consists of a stonelined chute. The spillway is 39 feet long with 4H:1V sideslopes. The spillway discharge channel extends 625 feet downstream of the weir and bypasses Kehly Run Dam No. 4. The spillway and reservoir are capable of controlling approximately 75% of the PMF without overtopping the earth embankment. Based on criteria established by the Corps of Engineers, this spillway is termed inadequate. The long term affect of the seepage and wet areas on the abutments, and erosion of the slopes should be evaluated. Heavy growth of vegetation on the slopes should be selectively removed.

AD-A083 749/2 MF A01
Kimball (L Robert) and Associates Ebensburg PA
National Dam Inspection Program. Brandonville Pumping Station Dam (NDS ID Number PA-661 DER ID Number 54-58) Susquehanna River Basin, Davis Run, Schuylkill County, Pennsylvania. Phase I Inspection Report,
R. Jeffrey Kimball. Mar 80, 77p
Contract DACW31-80-C-0020
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Brandonville Pumping Station Dam is an earthfill dam, 374 feet long and approximately 21 feet high. The top width varies from approximately 24 feet to 52 feet. The upstream slope is 1.5H:1V and protected with grouted riprap. The downstream slope is formed by a dry masonry wall and varies from 1H:1V to nearly vertical. A 4 foot wide walkway is provided near the center of the downstream slope at the right abutment. The spillway is located on the right abutment and consists of a grouted masonry lined overflow. The spillway is 40 feet wide and near ogee in shape. The inspection and review of data of Brandonville Pumping Station Dam did not reveal any problems which require emergency action. The dam appears to be in fair condition but poorly maintained. The spillway and reservoir are capable of controlling 6% of the PMF. Based on criteria established by the Corps of Engineers, the spillway is termed inadequate, but not seriously inadequate.

AD-A083 750/0 MF A01
D'Appolonia Consulting Engineers Inc Pittsburgh Pa
National Dam Inspection Program. Sample Run Dam (NDI I.D. Number PA-00284, DER I.D. Number 32-14) Ohio River Basin, Unnamed Tributary of Two Lick Creek, Indiana County, Pennsylvania. Phase I Inspection report,
Lawrence D. Andersen. 1980, 67p
Contract DACW31-80-C-0022
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Sample Run Dam consists of an earth embankment approximately 325 feet long with a maximum height of approximately 23 feet from the downstream toe. The crest width is approximately 10 feet. As designed, the downstream face of the dam was to be protected by grass, and a vertical concrete wall on the upstream side was to provide shoreline protection. Presently, the downstream face of the dam is covered with brush and trees up to 10 feet high and the concrete wall on the upstream side has partially collapsed. The spillway structures are comprised of an 18-foot-wide concrete ogee overflow section which discharges into an 18-foot-long concrete channel, incorporating an energy dissipator sill. Based on the evaluation of the existing conditions, the condition of Sample Run Dam is considered to be poor. The dam is abandoned and is in complete disrepair. A valve house located at the downstream toe of the dam has collapsed, covering most of the operating equipment with rubble. The flood discharge capacity of the dam was evaluated according to the recommended procedure and was found to pass 20 percent of the probable maximum flood (PMF).

AD-A083 751/8 MF A01
Kimball (L Robert) and Associates Ebensburg PA
National Dam Inspection Program. Raven Run Dam Number 3 (NDS ID Number PA-656 DER ID Number 54-8) Susquehanna River Basin, Lost Creek, Schuylkill County, Pennsylvania. Phase I Inspection Report,
R. Jeffrey Kimball. Mar 80, 71p
Contract DACW31-80-C-0020
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Raven Run Dam No. 3 is an earth and rockfill dam 1,080 feet long and 40 feet high. The crest width of the dam varies from 10 feet wide to 24 feet wide. A secondary embankment (Right Arm) is located north of the main embankment. This embankment is 320 feet long and 7 feet high. The crest width is 8 feet. The spillway is located on the main embankment 780 feet from the left abutment. The spillway is rectangular shaped with stone masonry retaining walls forming the sides. The weir length is 40 feet long. The spillway discharges into a gully created by erosion and eventually flows into Raven Run No. 2 Reservoir. The inspection and review of data of Raven Run Dam No. 3 did not reveal any problems which require emergency action. The dam appears to be in fair condition but poorly maintained and operated. The spillway and reservoir are capable of controlling approximately 58% of the PMF. Based on criteria established by the Corps of Engineers, the spillway is termed inadequate.

AD-A083 752/6 MF A01
D'Appolonia Consulting Engineers Inc Pittsburgh PA
National Dam Inspection Program. Bear Rock Number 2 Dam (NDI I.D. Number PA-0441, DER I.D. Number 11-3) Ohio River Basin, Bear Rock Run, Cambria County, Pennsylvania. Phase I Inspection Report,
Lawrence D. Andersen. 1980, 73p
Contract DACW31-80-C-0022
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Bear Rock No. 2 Dam consists of an earth embankment approximately 760 feet long with a maximum height of about 42 feet from the downstream toe and a crest width of about 6 feet. The crest and upstream and downstream faces of the dam are covered with riprap. The flood discharge facilities of the dam consist of a 33-ft. rectangular stone masonry overflow spillway located on the left abutment (looking downstream). The spillway is 33 feet wide and about 4 feet deep at the control section and uniformly converges into the spillway discharge channel. The spillway discharge channel is a stone masonry chute, which terminates at a plunge pool. A dike along the right side of the spillway discharge channel is provided to prevent flow towards the toe of the dam. The outlet facilities

consist of a 16-inch cast-iron blow-off pipe and a 12-inch cast-iron supply pipe. Based on the evaluation of the existing conditions, the condition of Bear Rock No. 2 Dam is considered to be unsafe/nonemergency. The structural condition of the embankment is considered to be good. The spillway capacity was evaluated according to the recommended procedure and was found to pass 30 percent of the probable maximum flood (PMF) without overtopping the embankment.

AD-A083 753/4 MF **A01**
D'Appolonia Consulting Engineers Inc Pittsburgh PA
National Dam Inspection Program. Bear Rock Number 1 Dam (NDI I.D. Number PA-00439, DER I.D. Number 11-2), Ohio River Basin, Bear Rock Run, Cambria County, Pennsylvania. Phase I Inspection Report,
Lawrence D. Andersen. 1980, 77p
Contract DACW31-80-C-0022
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Bear Rock No. 1 Dam consists of an earth embankment approximately 560 feet long with a maximum height of about 26 feet from the downstream toe and a crest width of about 8 feet. The upstream and downstream faces and crest of the dam are covered with riprap. The flood discharge facilities of the dam consist of a stone masonry structure with a flow width of 58 feet. The discharge from the spillway flows into an unprotected discharge channel which follows the left side of the valley. A dike is provided along the right side of the spillway discharge channel to prevent flows towards the toe of the dam. The outlet facilities consist of a 16-inch cast-iron blow-off pipe and 10- and 12-inch cast-iron supply pipes. Based on the evaluation of the existing conditions, the condition of Bear Rock No. 1 Dam is considered to be unsafe/nonemergency due to the seriously inadequate spillway capacity (30% of PMF). The condition of the embankment is considered to be fair.

AD-A083 771/6 PC **A03**/MF **A01**
Gilbert Associates Inc Reading PA
Schuylkill River Basin Post Hurricane Agnes Flood Damage Survey.
Final rept.
Dec 72, 32p
Contract DACW61-73-C-0231

Hurricane Agnes and the resulting rains struck eastern Pennsylvania on June 23, 1972 causing extensive flooding. In August 1972, the U.S. Army Corps of Engineers, Philadelphia District contracted a consulting engineering firm for a post flood damage study of the entire Schuylkill River Basin in southeastern Pennsylvania. Data was collected from various municipal authorities and experts in the fields of railroads, highways, and utilities. Cost data is provided for each municipality near streams in the effected area plus data on intangible damages due to the water and the flood effects on sewage systems. (Author)

AD-A083 998/5 PC **A24**/MF **A01**
URS/Madigan-Praeger Inc New York
A Comprehensive Study of the Tocks Island Lake Project and Alternatives. Part A. Chapters I, II, III. Analysis of Service Areas and Resource Needs.
Contract rept.
Jun 75, 552p
Contract DACW51-75-C-0026
See also Part A, Chapter 4, 5, 6, AD-A083 999 and Part B, AD-A084 000. Prepared in cooperation with Conklin and Rossant, New York.

The purpose of this study is to help decision makers determine future water resource needs of the Delaware River Basin area and ways of meeting these needs. This report, undertaken in 1975 for the U.S. Army Corps of Engineers by an independent consultant firm, describes the natural features of the study area, land use, employment, and population trends. A chapter in this volume focuses on the average annual flood damages of the area and reviews the existing flood damage reduction needs in the Delaware Basin. Water supply and water consumption for the Basin is also analyzed both for residential and industrial needs. Existing water supplies were inventoried and projections made to the year 2025. The most significant water supply need in the basin is found to be the flow necessary to prevent serious salinity intrusion in the Delaware Estuary. (Author)

AD-A083 999/3 PC **A21**/MF **A01**
URS/Madigan-Praeger Inc New York
A Comprehensive Study of the Tocks Island Lake Project and Alternatives. Part A. Chapters IV, V, VI. Analysis of Service Areas and Resource Needs.
Contract rept.
Jun 75, 481p
Contract DACW51-75-C-0026
See also Part A, Chapters 1, 2, and 3, AD-A083 998 and Part B, AD-A084 000. Prepared in cooperation with Conklin and Rossant, New York.

The purpose of this study is to help decision makers determine future water resource needs of the Delaware River Basin area and ways of meeting these needs. This report undertaken in 1975 for the U.S. Army Corps of Engineers by a consultant firm describes and analyzes the outdoor recreational needs of the Delaware River Basin. Recreation demand forecast tables are provided in the data. A chapter on electric power development for the area and project power plant water consumption under both present and future technology. The effects of water quality requirements upon 3 zones of the Delaware River is also studied. (Author)

AD-A084 000/9 PC **A23**/MF **A01**
URS/Madigan-Praeger Inc New York
A Comprehensive Study of the Tocks Island Lake Project and Alternatives. Part B. Review of Tocks Island Lake Project.
Contract rept.
Jun 75, 544p
Contract DACW51-75-C-0026
See also Part C, AD-A084 001. Prepared in cooperation with Conklin and Rossant, New York.

The purpose of this study is to help decision makers determine future water resource needs of the Delaware River Basin area and ways of meeting these needs. This report undertaken in 1975 for the U.S. Army Corps of Engineers by an independent consultant firm comprises a brief review of the technical engineering planning performed in the development of the project in regard to the adequacy of preliminary project planning, the use of statistics in project formulation, planning procedures, eutrophication and other water quality considerations etc. (Author)

AD-A084 001/7 PC **A24**/MF **A01**
URS/Madigan-Praeger Inc New York
A Comprehensive Study of the Tocks Island Lake Project and Alternatives. Part C. Analysis of Alternatives to Supply Resource Needs.
Contract rept.
Jun 75, 565p
Contract DACW51-75-C-0026
See also Part D, AD-A084 002. Prepared in cooperation with Conklin and Rossant, New York.

The purpose of this study is to help decision makers determine future water resource needs of the Delaware River Basin area and ways of meeting these needs. This report undertaken in 1975 for the U.S. Army Corps of Engineers by an independent consultant firm focuses on the identification and evaluation of the full range of alternatives with respect to supplying water by means other than the Tocks Island Project, the recreation, electric power, flood control and other project alternatives. (Author)

AD-A084 002/5 PC **A12**/MF **A01**
URS/Madigan-Praeger Inc New York
A Comprehensive Study of the Tocks Island Lake Project and Alternatives. Part D. Institutional Alternatives.
Contract rept.
Jun 75, 261p
Contract DACW51-75-C-0026
See also Part E, AD-A084 003. Prepared in cooperation with Conklin and Rossant, New York.

The purpose of this study is to help decision makers determine future water resource needs of the Delaware River Basin area and ways of meeting these needs. This report undertaken in 1975 for the U.S. Army Corps of Engineers by an independent consultant firm describes the evaluation of the modification of the water regime of the 1954 Supreme Court Decree on the principles applied in adjudicating disputes between states over waters of interstate streams. Chapters are also devoted to the analysis and comparison of the Delaware Water Gap National Recreation area with and without a lake, project deauthorization, deferral, and evaluation of institutional alternatives. (Author)

AD-A084 003/3 PC **A99**/MF **A01**
URS/Madigan-Praeger Inc New York
A Comprehensive Study of the Tocks Island Lake Project and Alternatives. Part E. Land Use and Secondary Effects of Tocks Island Lake Project.
Contract rept.
Jun 75, 860p
Contract DACW51-75-C-0026
See also part 1, Chapters 1, 2, 3, AD-A084 000 and Chapters 4, 5, 6, AD-A083 999. Prepared in cooperation with Conklin and Rossant, New York.

The purpose of this study is to help decision makers determine future water resource needs of the Delaware River Basin area and ways of meeting these needs. This report undertaken in 1975 for the U.S. Army Corps of Engineers by an independent consultant firm studies the effects of the proposed Tocks Island Lake, and Dam, pumped storage facilities, and Delaware Water Gap National Recreational area on the surrounding communities. These effects are reviewed in the following broad categories: economic impacts, land use effects, public service, utilities and solid waste disposal impacts, environmental impacts, and institutional considerations. Recreation-oriented highway travel and requirements by the major highway network in the study area are also evaluated. (Author)

AD-A084 049/6 PC **A14**/MF **A01**
Cambridge Univ (England) Dept of Civil Engineering
Centrifugal Modelling of Soil Structures. Part III. The Stability of River Banks and Flood Embankments.
Final technical rept. 6 May 76-5 May 79,
Christopher John Padfield, and Andrew N. Schofield. Oct 78, 305p
Grant DA-ERO-76-G-040
Doctoral thesis. See also Part 1, AD-A084 048.

This dissertation concerns two real problems of instability on the banks of major rivers. The two rivers, the Thames and the Mississippi, are both extensively canalised. Instabilities may develop in the river banks at times of flood and threaten to re-establish the natural regime of the rivers with a concomitant risk to life and installations behind the flood defences. The two problems of instability were selected for this study both for their practical importance, and for their illustration of a theme: the interaction of two layers of soil. In each case the river bank instability may take alternative forms depending on the relative geometry of the soil layers involved. The objectives of the investigation was to show that the modes of failure which are observed in the field may be understood in terms of the mechanisms by which the two layers interact with one another during failure.

AD-A084 058/7 PC **A03**/MF **A01**
O'Brien and Gere Engineers Inc Philadelphia PA Justin and Courtney Div
National Dam Safety Program. Edgemoor Reservoir (DE00012). Delaware River Basin. Shellpot Creek Offstream, New Castle County, Delaware. Phase I Inspection Report.
Final rept.,
John J. Williams. Dec 79, 49p
Contract DACW61-78-C-0052
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Edgemoor Reservoir is an offstream impoundment located approximately 1,000 feet west of Shellpot Creek and 300 feet east of the corporate boundary of the City of Wilmington, Delaware. The dam is a homogeneous earth embankment aligned in a circular configuration in plan so that the dam completely encloses the reservoir. The circular length of the embankment is approximately 1,760 feet and the maximum height is about 17 feet. The inte-

rior slope of the embankment is lined with concrete and stone masonry. The reservoir functions as a water supply impoundment for the Wilmington Suburban area. The selected design storm for this Small size, High hazard dam is 50 percent of the Probable Maximum Precipitation (PMP). The reservoir is capable of retaining approximately 88 percent of the design storm without overtopping of the embankment. The initial reservoir level was taken as Elevation 82.3, which is shown as the flow line elevation (one foot below the top of dam). The design storm would overtop the embankment by approximately 1.7 inches. Therefore, the flood storage capacity of the reservoir is inadequate for retaining the design storm.

AD-A084 059/5 PC **A04**/MF **A01**
Howard Needles Tammen and Bergendoff New York
Chesapeake City Bridge. Bridge Inspection Report Number 11B.
Dec 79, 67p
Contract DACW61-79-D-0019
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

This report presents the findings and recommendations for the 1979 inspection of the Chesapeake City Bridge (Route designation, U.S. Route 213) which crosses the Chesapeake and Delaware Canal. Technical information is given on the condition of the main and approach piers, access stairways, abutments, paint, bridge deck, and the general site. The Chesapeake City Bridge is in good structural condition. The most important items of maintenance and repair relate to cleaning and painting metalwork under the joints in the girder spans. Periodic cleaning of the roadway gutters, neoprene expansion joints, and flushing of the roadway drainage system and tied-arch lower gusset plates would be a cost-effective preventative maintenance program.

AD-A084 060/3 PC **A04**/MF **A01**
Howard Needles Tammen and Bergendoff New York
St. Georges Bridge. Bridge Inspection Report Number 11A.
Dec 79, 73p
Contract DACW61-79-D-0019
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

This report presents the findings and recommendations for the 1979 inspection of the St. Georges Bridge (route designation, U.S. Route 13) which crosses the Chesapeake and Delaware Canal. Technical information is given on the condition of the main and approach piers, access stairways, abutments, superstructure steelwork, paint, bridge deck, railings, drainage and general site. The St. Georges Bridge is in good structural condition. Major items of maintenance and repair relate to cleaning and painting of metalwork under joints in the arch span and the adjacent girder spans, making the neoprene expansion joints watertight, cleaning and freeing the restrained stringer and girder span expansion bearings, and making adjustments and repairs to roller nests of the arch span if monitoring ascertains that they are not functioning.

ANL/CEN/FE-79-12 PC **A03**/MF **A01**
Argonne National Lab., IL.
Limestone Sorbent Regeneration in Externally Fired Rotary Kilns.
D. S. Moulton, and F. F. Nunes. Dec 79, 41p
Contract W-31-109-ENG-38

Externally fired rotary kilns were evaluated for use as regeneration reactors for the spent limestone sorbent from a fluid-bed combustor. Coke and spent sorbent containing approximately 8 wt % sulfur were reacted at temperatures between 960 and 1060 exp 0 C in two laboratory-scale externally fired rotary kilns to produce lime sorbent suitable for reuse, and concentrated SO sub 2 . It was possible to achieve a high percent of sorbent regeneration, but the SO sub 2 concentration in the off-gas was low. Different operating conditions were required to produce a higher concentration of SO sub 2 in the off-gas, and under these conditions, the percent of sorbent regeneration was low. Two empirical equations and the shrinking-core reaction-rate model were examined for application to the experimentally determined kinetic data. The shrinking-core model appeared to fit the data better than the empirical equations, and could be a useful predictor of the conversion of sulfated limestone and of the SO sub 2 concentration in the off-gas from a rotary-kiln regenerator. The materials used in the construction of one of the laboratory kilns were typical of commercially available production-size rotary kilns that are externally fired. However, the materials of construction were not sufficiently durable to withstand the high SO sub 2 concentrations and high temperatures involved in this reaction. (ERA citation 05:014749)

CONF-791172-1 PC **A02**/MF **A01**
Argonne National Lab., IL.
Environmental Assessments of Alternative Energy Strategies in the United States.
, S. W. Ballou, and A. M. Katz. 1979, 18p
Contract W-31-109-ENG-38
International institute for applied systems analysis conference, Vienna, Austria, 5 Nov 1979.

The Regional Issues Identification and Assessment (RIIA) program is an evaluation of the regional impacts of future energy development. These studies are conducted for the Department of Energy. The impacts described in this paper for 1990 are based on a national energy projection (scenario) that assumes medium energy demand and fuel supply through 1990, but does not incorporate the policies of the 1978 National Energy Act. The RIIA study plan uses the predicted fuel mixes derived from the PIES scenario as a starting point for its analysis. County level patterns for utility, industry and mining activities for 1990 were then developed from the federal region totals. Energy sources addressed were coal, nuclear, oil, oil shale, gas, geothermal, hydroelectric, and solar. The impact of these county-level patterns of utility, industry, and mining activities on the air, water, and land resources of the country and on the socioeconomic and health and safety aspects of the nation's welfare are analyzed. (ERA citation 05:016701)

COO-5107-1 PC **A20**/MF **A01**
Denver Research Inst., CO.
Predicted Costs of Environmental Controls for a Commercial Oil Shale Industry. Volume 1. An Engineering Analysis.
T. D. Nevens, W. J. Culbertson, Jr., J. R. Wallace, G. C. Taylor, and A. P. Jovanovich. Jul 79, 471p
Contract EP-78-S-02-5107

The pollution control costs for a commercial oil shale industry were determined in a joint effort by Denver Research Institute, Water Purification Associates of Cambridge, and Stone and Webster Engineering of Boston and Denver. Four commercial oil shale processes were considered. The results in terms of cost per barrel of syncrude oil are predicted to be as follows: Paraho Process, $0.67 to $1.01; TOSCO II Process, $1.43 to $1.91; MIS Process, $2.02 to $3.03; and MIS/Lurgi-Ruhrgas Process, $1.68 to $2.43. Alternative pollution control equipment and integrated pollution control strategies were considered and optimal systems selected for each full-scale plant. A detailed inventory of equipment (along with the rationale for selection), a detailed description of control strategies, itemized costs and predicted emission levels are presented for each process. Capital and operating cost data are converted to a cost per barrel basis using detailed economic evaluation procedures. Ranges of cost are determined using a subjective self-assessment of uncertainty approach. An accepted methodology for probability encoding was used, and cost ranges are presented as subjective probability distributions. Volume I presents the detailed engineering results. Volume II presents the detailed analysis of uncertainty in the predicted costs. (ERA citation 05:014867)

DOE/ERA-0056-1 PC **A06**/MF **A01**
Department of Energy, Washington, DC. Economic Regulatory Administration.
National Power Grid Study. Volume I. Final Report.
Jan 80, 117p

Although entitled The National Power Grid Study, a phrase generally associated with electrical transmission, this report consists of an investigation of both generation and transmission resources; in other words, the nation's bulk power supply system. Included are not only the existing and potential physical elements of that system (powerplants, transmission networks, major substations, control facilities, and the like), but also existing and potential organizational arrangements and governmental participation. The Report does not inquire into the matter of utility distribution systems. Together with supporting technical research published in Volume II, this report describes the current bulk power supply system in the US, problems facing the electric-utility industry, realistic options, potential benefits and costs of those options, some guiding principles for decision making, findings of fact, and recommendations and proposals. In terms of timeframe, the Report and its constituent studies look generally to the period between now and the turn of the century. A shorter timeframe is required within which to plan, design, and deploy major new transmission and generation facilities; a longer timeframe is needed within which to fully depreciate such facilities. But generally, the study concerns itself with the next 20 years. Throughout this Report reference will be made to physical interconnection, coordinated planning and development, and integrated operations. It is through these mechanisms that economic savings might be realized, reliability improved, or energy conserved. (ERA citation 05:015926)

DOE/ERA-0056/3 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Economic Regulatory Administration.
National Power Grid Study. Executive Summary.
Jan 80, 19p

The National Power Grid Study examined possible Federal roles ranging from little or no Federal intervention to the much greater Federal intervention proposed by the late Senator Metcalf and others. Recommendations made represent a significant new Federal thrust. While relying heavily upon the existing industry structure to plan, design, build, and operate the electric power system, the recommendations provide a mechanism for developing and evaluating improvements perceived by government agencies. While recognizing that transmission cannot substitute for inadequate generation, they provide a mechanism for building a transmission system capable of utilizing regional load and generation imbalances. While recognizing local and regional differences, and the role of appropriate technologies, they ensure that national goals are not forgotten. All this can be done with minimum subsidies and minimum Federal presence. Taken together, the recommendations provide a balanced approach to reducing dependence on imported oil, switching to abundant domestic fuels, utilizing efficiencies of scale in investments and operations to slow rising costs, and providing a flexible system capable of responding more effectively to power-supply disruptions. Study recommendations and the background of the study are detailed in this Executive Summary. (ERA citation 05:015927)

DOE/ERD-0012(Rev.) PC **A06**/MF **A01**
Department of Energy, Washington, DC. Assistant Secretary for Environment.
Environmental Readiness Document: Coal Gasification. Commercialization Phase III Planning.
Sep 78, 111p

Coal gasification processes under active consideration for commercialization have been divided into three categories: high, medium and low Btu gas processes. It has been determined, based on available environmental data, that high and medium Btu gasification processes have moderate to good probabilities of achieving environmental acceptability. Small, low Btu gasifiers (less than 100 TPD) are considered to have a good probability of achieving environmental acceptability, based primarily on their small size. Key environmental concerns which have been identified for high and medium Btu coal gasification are: siting; worker protection; potential public health risks from process products, byproducts, and emissions; and management of solid wastes. These same concerns apply to small low-Btu gasification; however, the degree of concern is less. Presently, no envi-

ronmental barriers to coal gasification processes exist under Environmental Protection Agency and Occupational Safety and Health Administration regulations. However, both the gasification system and end use combustion processes will have to meet New Source Performance Standards for SO sub 2 , NO/sub x/ and particulates, implying increases in control requirements. In addition to current EPA and OSHA regulations a series of new regulations are proposed. EV has determined that a significant research program will be required to firmly establish the environmental and health effects of coal gasification. An outline for a suggested program to mitigate such effects is presented in Appendix A. (ERA citation 05:014642)

DOE/EV-0042 PC **A12**/MF **A01**
Department of Energy, Washington, DC. Div. of Environmental Control Technology.
Divison of Environmental Control Technology Program, 1978.
Jun 79, 259p

This report covers Division of Environmental Control Technology projects in progress during FY 1976, within the Office of the Assistant Secretary for Environment, Department of Energy. It is the second in a planned series of annual reports. The Division of Environmental Control Technology (ECT) continues to support the Assistant Secretary for Environment (EV) in discharging two primary responsibilities: (1) under the Environmental Engineering (EE) Program, the independent overview and assessment of environmental control aspects of both the U.S. Department of Energy's (DOE) research, development, and demonstration (RD and D) programs and the Nation's energy policies, and (2) under the Decontamination and Decommissioning Program, the reduction of potential environmental hazards at the radioactively contaminated sites that are presently owned or were formerly used by the Government. This report presents a short summary of objectives, approach, progress and results, future plans, and a reference bibliography for each research, development, or assessment project within the program areas described above. (ERA citation 05:016444)

FE-2709-T2 PC **A03**/MF **A01**
Linhardt and Associates, Inc., Newport Beach, CA.
Investigation of High Velocity Wedge Separator for Particle Removal in Coal Gasification Plants. Quarterly Report, October 31, 1979.
H. D. Linhardt. 31 Oct 79, 37p
Contract EF-77-C-01-2709

Phase IA and II are proceeding concurrently and are leading to meaningful results meeting the basic contract objectives. Significant progress has been made during the reporting period. The parameters governing the collection efficiency have been well identified by theory and experiment. For optimized HTPS geometries, it has been found the Mach-number is of secondary consideration. The velocity ratio of purge flow to main flow at the collection port area should approach unity and the purge to main flow area ratio needs to be optimized for the desired particle range to be separated. In addition, geometries need to be adjusted to accommodate larger particles, which otherwise might bounce and eventually miss the collection slot. Experimental work has demonstrated 99% collection efficiency at design temperature. Additional testing is required in order to provide a complete and consistent data base which will be applied toward the detailed conceptual design of the commercial scale unit. (ERA citation 05:017320)

IS-T-880 PC **A06**/MF **A01**
Ames Lab., IA.
Fluidization Characteristics of Power-Plant Fly Ashes and Fly Ash-Charcoal Mixtures.
C. T. Nguyen. Mar 80, 102p
Contract W-7405-ENG-82
Thesis.

As a part of the continuing research on aluminum recovery from fly ash by HiChlor process, a plexiglass fluidization column system was constructed for measurement of fluidization parameters for power-plant fly ashes and fly ash-charcoal mixtures. Several bituminous and subbituminous coal fly ashes were tested and large differences in fluidization characteristics were observed. Fly ashes which were mechanically collected fluidized uniformly at low gas flow rates. Most fly ashes which were electrostatically precipitated exhibited channeling tendency and did not fluidize uniformly. Fluidization characteristics of electrostatically collected ashes improve when the finely divided charcoal powder is added to the mixture. The fluidization of the mixture was aided initially by a mechanical stirrer. Once the fluidization had succeeded, the beds were ready to fluidize without the assistance of a mechanical action. Smooth fluidization and large bed expansion were usually observed. The effects of charcoal size and aspect ratio on fluidization characteristics of the mixtures were also investigated. Fluidization characteristics of a fly ash-coal mixture were tested. The mixture fluidized only after being oven-dried for a few days. (ERA citation 05:014710)

IS-4730 PC **A05**/MF **A01**
Ames Lab., IA.
Fossil Energy Quarterly Report, October 9, 1979-December 31, 1979.
Feb 80, 100p
Contract W-7405-ENG-82

Conditions for the chemical desulfurization of fine-size coals by leaching with hot alkaline solutions containing dissolved oxygen under pressure were investigated further. It was confirmed through experiments conducted with a 1-liter autoclave that about 46% of the organic sulfur can be removed from Illinois No. 6 coal by a single alkaline leaching step. Benefits of acidic and alkaline leaching conditions were compared. At higher oxygen partial pressures (e.g., 200 psia) the removal of pyritic sulfur from Illinois No. 6 coal seems to be favored by oxydesulfurization in an acidic solution while the removal of organic sulfur is favored by oxydesulfurization in an alkaline solution. Treatment of coal with methyl iodide followed by extensive washing with a solvent to remove the reaction products was used to remove approximately one-half of the organic sulfur content in an Iowa high volatile bituminous coal. The pyritic and sulfatic sulfur content was not affected by the methyl iodide treatment. Washing the coal with solvent only did not produce any effect either. On the basis of chemical reactions reported in the literature, it is assumed that the reactive sulfur groups that were removed by this treatment may be organic sulfides or mercaptans. Subsequent leachings of the methyl iodide-treated coal under various conditions of oxydesulfurization did not reduce further the organic sulfur content. The inorganic sulfur content, however, was reduced by the oxydesulfurization steps. It can be assumed that all the reactive and accessible organic sulfur was removed by the methyl iodide treatment, and further chemical desulfurization was directed only against the inorganic sulfur. A laboratory study of various conditions for the froth flotation method of cleaning a high volatile bituminous coal from the Dahm mine in Marion County, Iowa, produced some unusual results. (ERA citation 05:017321)

IS-4731 PC **A02**/MF **A01**
Ames Lab., IA.
Direct Utilization-Recovery of Minerals from Coal Fly Ash. Fossil Energy Program. Technical Progress Report, 1 October 1979-31 December 1979.
G. Burnet, and M. J. Murtha. Mar 80, 20p
Contract W-7405-ENG-82

Research is focused on the development of methods for recovering minerals from power plant fly ash. Definition and refinement of steps in the high-temperature (HiChlor) gas chlorination process and in the lime-soda sinter process are emphasized. Samples of chlorinated ash residues were analyzed to determine changes in physical structure and to measure compositions of individual particles. The results show that when ash particles are fractured by heat treatment the chlorination of contained alumina and iron is more complete. The use of SiCl sub 4 as a chlorination agent in addition to chlorine was studied as a method to reduce the amount of silica being chlorinated. Optimum conditions for SiCl sub 4 partial pressure and reaction temperature reduced the percentage of silica chlorinated from 20% without SiCl sub 4 to about 5%, with minimal reduction in the percentage of alumina reacted. Evaluation of waste FGD sludges and FBC residues for use as lime resources in the lime-soda sinter process has begun, and further research was conducted on high-pressure desilication of sinter extraction filtrates. At optimum conditions, the concentration of dissolved silica was reduced by 60%, but this is still in excess of the silica specification for alumina used in metal production. Chemical beneficiation of magnetically separated fly ash showed that the contained silica dissolves quickly during a high-pressure alkali extraction, and that most of the contained alumina is dissolved after one-half hour. Development of a two-stage process, first dissolving the silica and then the alumina in even less time, shows promise of further reducing the size and cost of the extraction equipment required. (ERA citation 05:017356)

N79-79862/5 PC **A09**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Solid Waste Management Programs.
Available Information Materials on Solid Waste Management, Total Listing, 1966 to 1978.
1979, 180p EPA/530/SW-58.29

The catalog lists publications and other educational materials on solid waste that have been published or collected by the U.S. Environmental Protection Agency. The subject index reflects the entire scope of the work undertaken by EPA's solid waste program from 1966 to the present and is intended for researchers.

N80-22875/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
The Relative Importance of Noise Level and Number of Events on Human Reactions to Noise: Community Survey Findings and Study Methods.
J. M. Fields. Mar 80, 25p NASA-TM-81795
Presented at 98TH Acoustical Soc. Of AM. Meeting, Salt Lake City, Utah, 26-30 Nov. 1979.

The data from seven surveys of community response to environmental noise are reanalyzed to assess the relative influence of peak noise levels and the numbers of noise events on human response. The surveys do not agree on the value of the tradeoff between the effects of noise level and numbers of events. The value of the tradeoff cannot be confidently specified in any survey because the tradeoff estimate may have a large standard error of estimate and because the tradeoff estimate may be seriously biased by unknown noise measurement errors. Some evidence suggests a decrease in annoyance with very high numbers of noise events but this evidence is not strong enough to lead to the rejection of the conventionally accepted assumption that annoyance is related to a log transformation of the number of noise events.

N80-23219/2 PC **A02**/MF **A01**
Netherlands Organization for Applied Scientific Research TNO, Delft. Planologisch Studiecentrum TNO.
Two Estimation Methods for Singly Constrained Spatial Distribution Models.
J. Vanest, and J. Vansettin. Feb 78, 23p TNO-78/PS/41

Distribution models used the description of spatial phenomena like residential and shopping interactions are examined. A singly constrained distribution model is considered which can be used for the description of several relationships, such as home-shop interactions. Those interactions are influenced by several factors, e.g., attraction and distance variables. The influence of explanatory variables finds expression in the accessory parameters. The estimation of the values of these parameters, and the testing of their significance is called calibration. The two best known estimation procedures, i.e., the maximum likelihood and the least squares method are considered. For the singly constrained trip distribution model the linear least squares method is used directly after a special logarithmic transformation without taking into account additivity constraints and without an iterative procedure. The maximum likelihood method is also shown from a statistical point of view, to have useful properties.

ORNL/TM-7071 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Stabilization of Coal Wastes by Crystallization.
R. J. Lauf, J. I. Federer, and V. J. Tennery. Mar 80, 45p

Contract W-7405-ENG-26

All bituminous coals contain minerals, which upon combustion result in residual matter, either ash or slag. Numerous conversion processes are now being investigated to determine the engineering and economic potential for producing hydrocarbon gases or liquids from coal. An important aspect of this issue is the nature of the residual matter from the conversion process and the prospects for its safe disposal. The ash from the Hygas process was studied to determine its crystallization properties when cooled from the melt. The Hygas ash produced a melt primarily Al sub 2 O sub 3 -SiO sub 2 -Fe sub 2 O sub 3 with a low alkali and alkaline earth content and a small amount of other impurities. When this materials was cooled at various rates from 1400 exp 0 C after different hold times at temperature, the only significant phase that crystallized from the melt was iron oxide in the form of hematite, Fe sub 2 O sub 3 , plus some magnetite, Fe sub 3 O sub 4 . Synthetic slag compositions containing from 9 to 31 wt % Na sub 2 O were prepared to reduce the refractoriness of the Hygas slag, and these additions reduced the temperature for homogeneous melt development from about 1400 exp 0 C to about 1100 exp 0 C. Fluxing of the Hygas slag with sodium oxide additions increased the stability of the siliceous glass phase, but the only major crystalline phase developed was again Fe sub 2 O sub 3 . Extraction in boiling neutral water showed that use of sodium as a flux increases the leachability of Pb, Se, and Te from the cooled slag. These tentative results show that simple compositional alterations to wastes such as Hygas ash using Na sub 2 O to reduce the temperature required to conveniently work the slag can increase the leachability of Pb, Se, and Te and that the cooling history of the melt can significantly affect the ease of extraction of some trace elements. (ERA citation 05:014714)

PB80-172703 PC **A03**/MF **A01**
Denver Univ., CO.
Public Administration Field Service Program for Energy-Impacted Communities. A Computer Simulation Model to Analyze Municipal Water Rights.
Project rept.,
Ricard M. Acosta, Don Cacace, Lou Choi, and Luis Larcina. Jul 78, 36p HUD-0000871

Flexible and relatively simple, this computer model was designed and built under rigid time constraints for the North West Colorado Council of Governments to identify potential water users who face limited availability during drought situations or as a result of increased water use by other users. The model, in rough form, allows for parameter changes such as severity of drought (e.g., 10 - year to 50 - year droughts) and various low - flow figures (e.g., 7 - day, 30 - day, 60 - day). It also allows for 'increased' or 'conservation' levels of usage and a wide variety of geographical configurations. Parameter changes are achieved through manipulation of the data base. The model user may simulate either an individual water user or the entire system. The model was developed with dummy data to test the programs and logic and is equipped with 1966 U.S.G.S. gauging station data and 1974 priority water rights lists for Routt County, Colo. Model validation is a three - step process: (1) verification of the accuracy of dummy data, (2) modeling of current drought year with contemporary user data, and (3) test of the drought model against the actual drought situation to check discrepancies. Further studies should explore four basic areas, including literature searching, particularly on the CORSIM model and the Kent Holt model; validation of the model; updating of the data base with figures beginning mid - 1978; and expansion of the model to account for reservoirs, soil quality, water quality, precipitation factors, and transbasin diversions. References, flow charts, and an explanation of the computer subroutines are attached. (Author abstract modified).

PB80-172778 PC **A07**/MF **A01**
HRB-Singer, Inc., State College, PA. Energy and Natural Resources Program Dept.
Nature and Distribution of Subsidence Problems Affecting HUD and Urban Areas. (Task A).
Nov 77, 128p HUD-0000880, HUD/PDR-453/1
Contract HUD-H-2385

This HUD study discusses the extent of subsidence (land sinking) problems affecting various urban areas, risks from different kinds of subsidence, and their effects on and damage to communities. Three types of subsidence discussed in detail are subsidences from underground mining (especially coal) and subsidences occurring in organic wetlands and limestone terranes. Their locations and distributions are shown on accompanying maps. Through information obtained from numerous sources, the report concludes that subsidence is likely to grow worse throughout the country through increased mining and urban expansion into unsuitable land. Total costs amount to $89 million annually nationwide and result from physical damage, population dislocation, preventive measures, property value depreciation, and adverse growth effects; major social effects include disruption of services and facilities, neighborhood decline, and loss of community as residents must relocate. Subsidence through coal mining is especially likely to increase, as 40 million acres are threatened nationwide and 2 million have already subsided; it is estimated that subsidence due to mining costs property owners $30 million a year. Wetlands require constant attention if subsidence is to be avoided, while limestone terranes offer the least danger, due to proper investigation before building. Local officials and homeowners are often reluctant to acknowledge the existence of subsidence problems because they fear adverse economic effects or property depreciation; this makes it difficult to obtain data for developing preventive measures. The report recommends the subsidence information gap be quickly remedied and suggests that a central agency be set up to oversee research. Appendices include user's guides for maps, methods of estimating damage, characteristics of subsidence, and a list of urban areas subject to it because of mines.

PB80-172885 MF **A01**
Rahenkamp, Sachs, Wells and Associates, Inc., Philadelphia, PA.
Innovative Zoning: A Local Official's Guidebook,
David Stoloff. Nov 77, 28p HUD-0000895, HUD/PDR-289/1
Contract HUD-H-2333R
Prepared in cooperation with American Society of Planning Officials, Chicago, IL.
Paper copy available from the Sup. of Docs., Stock number 023-000-00485-2.

This guidebook for local officials answers questions on the uses and advantages of innovative zoning, discusses three current innovative techniques, and offers suggestions for getting innovative zoning adopted and making it work. Topics on negotiating with developers, drafting a goals statement, and obtaining additional information are also discussed. Innovative zoning offers more positive direction to landowners, increased flexibility, and greater public participation. Further, innovative zoning practices can combine with traditional ones. An example is adding alternative lot - size provisions to standard land - use regulations to permit clustered housing. Planned unit development can make possible larger areas of common open land, higher - density housing that reduces development costs per unit, more flexible development, a higher per capita tax base, varied - income housing, and a recorded development plan. Incentive zoning permits concessions to developers -- increased height or density -- in return for specific community improvements. Impact zoning permits comparison of a community's capacity with estimated demands, so that environmental impact is considered before construction. Information on obtaining a companion volume, 'The Innovative Zoning Digest,' is provided.

PB80-173115 PC **A02**/MF **A01**
Henningson, Durham and Richardson, Inc., Minneapolis, MN.
Solid Waste Energy and Resource Recovery Study for Hennepin County, Minnesota.
Executive summary,
Robert I. Pope, and Paul R. Ombruni. Nov 75, 17p HUD-0000982
Contract HUD-H-2141R
Prepared in cooperation with Johnson (Harry S.) Co., Inc., Lakeville, MN. Sponsored in part by Minnesota Pollution Control Agency, Minneapolis.

Results are reported from a study to determine the technical and economic feasibility of energy and resource recovery from solid waste in Hennepin County, Minn. Residential, commercial, and industrial waste generation rates were established on a per capita and per employee basis, and processable waste generation in tons per week was determined. The composition of the waste was evaluated for recoverable materials and also for energy. Reliable markets were identified for ferrous and aluminum metals, but because of uncontrollable influences on supply and markets, recovery of glass, paper, and cardboard was deemed questionable. Potential fuel markets were evaluated for supplemental fuel, steam, pyrolysis gas, and pyrolysis oil. The recommended energy recovery facility is a central steam plant near the Minneapolis central business district. The potential cost savings for the county through the proposed system is about $6 million per year in 1980 and $8 million per year in 1990. Hospital and health care wastes, automated waste collection systems, and environmental studies were undertaken. With special precautions, hospital and health care wastes could be accommodated at a resource recovery facility. Automated solid waste collection in the area analyzed was less economical than conventional truck collection. There will be no significant adverse environmental effects from the project, and there are several significant environmental benefits. The report has been submitted to the County Board of Commissioners, and decisions on implementation will be made by the Board after public review and response. Tabular and graphic data are provided. (Author abstract modified).

PB80-176142 PC **A02**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Water Resources Research Inst.
Desk Top Methodology for Modeling Biochemical Oxygen Demand in Streams.
Partial technical completion rept.,
William Whipple, Jr., and Joseph V. Hunter. Apr 80, 22p W80-04673, OWRT-A-046-NJ(4)
Contract DI-14-34-0001-9032

The modeling of dissolved oxygen as widely practiced involves considerable uncertainties due partly to the assumptions not fully represented by the model and also, usually great deficiencies in data. The diurnal fluctuation of oxygen complicates the water. Methods are presented and illustrated for modeling the BOD process instead, and later calculating the critical oxygen condition at the sag point only. The necessary computations can be made by hand calculator, and used quickly to check validity of data.

PB80-176456 PC **A09**/MF **A01**
Tennessee Valley Authority, Muscle Shoals, AL. Emission Control Development Projects.
Preliminary Economic Analysis of NOx Flue Gas Treatment Processes.
Final rept. Jul 77-Oct 79,
J. D. Maxwell, T. A. Burnett, and H. L. Faucett. Feb 80, 200p TVA-ECDP/B-6, EPRI/FP-1253, EPA-600/7-80-021
See also report for Oct 76-Jul 77, PB-276 637.

The report gives results of a preliminary economic evaluation of seven flue gas treatment (FGT) processes for the removal of NOx from power plant flue gas. The base case was a new, 500-MW power plant burning 3.5% sulfur coal and emitting 600 ppm NOx in the flue gas. Total capital investments and annual revenue requirements for three dry NOx-only removal processes were $38-48/kW and 2.1-3.6 mills/kWh, respectively. Total capital investments for these combined systems based on dry NOx removal were about $165-175/kW.

PB80-176795 PC **A10**/MF **A01**
Aerospace Corp., Los Angeles, CA. Energy and Resources Div.
Disposal of Flue Gas Cleaning Wastes: EPA Shawnee Field Evaluation - Third Annual Report.
Rept. for Sep 74-Jun 78,
R. B. Fling, P. R. Hurt, J. Rossoff, and J. R. Witz. Jan 80, 224p ATR-80(7660-05)-2, EPA-600/7-80-011
Contract EPA-68-02-2633
See also report dated Feb 78, PB-282 246.

The report describes progress made on a field evaluation project being conducted by the EPA to assess techniques for disposing of power plant

flue gas cleaning (FGC) wastes. The evaluation site is at TVA's Shawnee steam plant in Paducah, KY. Two prototype scrubbers, using lime and limestone absorbents and rated at 10 MWe, produced the sludges used in the project. By mid-1978, eight ponds were being evaluated: two untreated, three chemically treated, and three untreated with underdrainage. One underdrained pond contains sulfite sludge which has been oxidized to sulfate (gypsum). Groundwater, supernate, leachate, underdrain, runoff, and sludge and soil cores are being analyzed. After 3 years, the wastes in two of the chemically treated ponds and the untreated ponds with underdrainage are exhibiting the ability to shed water and to control seepage, respectively, and to support construction vehicles. The chemically treated pond under water reduces sludge permeability by about 1 order of magnitude as do the others, and provides strength but not traction for vehicles. Gypsum dewaters and handles easily, but its runoff and leachate must be controlled to prevent discharge to water supplies. It becomes structurally unstable when rewet; however, the disposal site can be managed to prevent these conditions.

PB80-176811 PC **A24**/MF **A01**
PEDCo-Environmental, Inc., Cincinnati, OH.
EPA Utility FGD Survey: October-December 1979.
Quarterly rept. Oct-Dec 79,
M. Smith, M. Melia, and N. Gregory. Jan 80,
571p EPA-600/7-80-029A
Contract EPA-68-01-4147
See also PB-279 214 and report dated Oct 79, PB80-131592.

This report is the first full compilation (not a supplement) since the December 1978 - January 1979 report. Because the next three reports are to be supplements, this issue should be retained for reference throughout the year. The report, which is generated by a computerized data base system, presents a survey of utility flue gas desulfurization (FGD) systems in the U.S. and Japan. It summarizes information contributed by the utility industry, process suppliers, regulatory agencies, and consulting engineering firms. Systems are tabulated alphabetically by development status (operational, under construction, or in planning stages), utility company, process supplier, process and waste disposal practice. It presents data on boiler design, FGD system design, fuel characteristics, and actual performance. It includes unit by unit dependability parameters and discusses problems and solutions associated with the boilers and FGD systems. Process flow diagrams and FGD system economic data are appended to the report.

PB80-176837 PC **E03**/MF **E03**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
Supply-Demand Price Coordination in Water Resouces Management.
Final rept.,
G. Guariso, D. Maidment, S. Rinaldi, and R. Soncini-Sessa. c1978, 33p RR-78-11

A scheme is proposed for the coordination by prices of water supplies and demands in a region. The objective is to maximize the total regional net benefit from water use and it is achieved when the marginal benefit at each demand point is equal to the marginal cost of delivering water to that point. The class of problems to which the scheme can be applied is determined from the graph of the network connecting supplies and demands. An example is presented in which the scheme is applied to analyze possible interbasin water transfers in the Northwest Water Plan in Mexico. (Copyright (c) 1978 International Institute for Applied Systems Analysis.)

PB80-176969 PC **A05**/MF **A01**
Arkansas Water Resources Research Center, Fayetteville.
Water, Waste and Quality Manageme nt During Preparation and Processing of Vegetables.
Completion rept. Apr 75-May 79,
W. A. Sistrunk. Aug 79, 85p PUB-65, W80-04671, OWRT-A-032-ARK(1)

Effluent from vegetable processing plants in the Ozark region was monitored to test and develop new systems of washing, peeling and blanching; to develop methods for utilization of solid wastes; and to reduce effluent wastestrength without affecting vegetable quality. From a processing plants' survey the following operation or factors were found to be the most critical: (1) washing and cleaning, (2) blanching and cooling, (3) high wastestrength from Irish potatoes, dry beans, and hominy processing, (4) suspended solids removal, and (5) excessive fresh water use. Various processing techniques were tested and waste water was sampled for biochemical oxygen demand, chemical oxygen demand, total suspended solids, settleable solids, and total solids. The new system of leafy greens washing cut water use by 70% while reducing wastestrength by 50%.

PB80-177025 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab., Research Triangle Park, NC.
Review of U.S. Environmental Protection Agency NO2 Monitoring Quality Assurance Program,
John R. Clements, and Thomas R. Hauser. 1980, 14p EPA-600/J-80-001
Pub. in Nitrogen Oxides and Their Effects on Health, ch7 p107-118, 1980.

A review of EPA's Quality Assurance Program for monitoring NO2 in ambient air is presented. Included are a discussion of the nationwide audit program, special audits of continuous monitors, the preparation of NO2 audit samples, and a general interpretation of the results of these programs.

PB80-177108 PC **A08**/MF **A01**
Pratt and Whitney Aircraft Group, West Palm Beach, FL. Government Products Div.
Advanced Combustion Systems for Stationary Gas Turbine Engines: Volume III. Combustor Verification Testing.
Final rept. Jan 78-Apr 79,
R. M. Pierce, C. E. Smith, and B. S. Hinton. Jan 80, 152p FR-11405, EPA-600/7-80-017C
Contract EPA-68-02-2136
See also Volume 2, PB80-175607.

The reports describe an exploratory development program to identify, evaluate, and demonstrate dry techniques for significantly reducing NOx from stationary gas turbine engines. Volume 3 describes the scaleup of the rich-burn/quick-quench (RB/QQ) model to a full-scale (25 MW) gas turbine combustor, and documents test results from the full-scale evaluations. Test results were very positive, showing that the RB/QQ concept can reduce NOx to approximately 45 ppm (at zero % O2) for clean distillate oil and to approximately 75 ppm for a distillate oil doped to 0.5% nitrogen, as pyridine. CO emissions below the 100 ppm program goal were also demonstrated. These tests also indicate that the new combustor concept may be capable of low emission performance on petroleum residual oil and synthetic liquid fuels such as SRC II or shale oil. Results from testing on those fuels is included in Volume 4, an addendum.

PB80-177173 PC **A04**/MF **A01**
Office of Science and Technology Policy, Washington, DC.
Scientific and Technical Needs for Hazardous Waste Management,
Louis H. Blair, Carl R. Gerber, and Leonard C. Slosky. Oct 79, 58p

This report offers recommendations for research and technology development and for the application of existing knowledge that should be given the highest priority during the next five years (FY 80-84) to achieve substantially more effective management of hazardous wastes. Improvements in handling existing waste disposal sites -- determining which pose the greatest threats and what should be done -- can occur rapidly if recommendations with near-term implications are implemented. Other recommendations with longer-term implications call for: improved procedures and data to define wastes and waste sites in terms of the degree of hazard they pose to human health and the environment; new and improved technologies for destroying or detoxifying future waste streams as well as mixtures of wastes already in 'problem' sites; criteria for siting new facilities; and an environmental research center dedicated to hazardous waste. In preparing this report, the authors reviewed Federal hazardous waste research activities. The Appendices describe how this review was conducted, define the problems as perceived by State and local governments, and present the findings and conclusions from which the recommendations have been drawn.

PB80-177207 PC **A09**/MF **A01**
Monsanto Research Corp., Dayton, OH.
Source Assessment: Dry Bottom Industrial Boilers Firing Pulverized Bituminous Coal.
Final rept. Aug 74-Jun 79,
W. R. McCurley, C. M. Moscowitz, J. C. Ochsner, and R. B. Reznik. Jun 79, 199p MRC-DA-900, EPA-600/2-79-019E
Contract EPA-68-02-1874
See also report dated Aug 79, PB80-138209.

The report describes and assesses the potential impact of air emissions, wastewater effluents, and solid wastes from the operation of dry bottom industrial boilers firing pulverized bituminous coal. Air emissions were characterized by a literature survey and field sampling. Significant emissions resulting from coal combustion were particulate matter, sulfur oxides (SOx), nitrogen oxides (NOx), hydrocarbons, polycyclic organic materials (POM), and a number of elements. The potential environmental impact of each emission species after passing through state-of-the-art controls was individually assessed using a calculated quantity known as the source severity. Species determined to have source severities greater than 1.0 were NOx (1.7), SOx (2.2), and POM (6.0). Pollutant concentrations were also measured in wastewater and solid waste streams. Effluent source severities were found to be significantly less than 1.0 for most species. The potential impact of solid waste discharges on the quality of air and of ground and surface water was also found to be minor when available controls were applied.

PB80-177215 PC **A21**/MF **A01**
Acurex Corp., Mountain View, CA.
Technology Assessment Report for Industrial Boiler Applications: NOx Combustion Modification.
Final rept. Jun 78-Jun 79,
K. J. Lim, R. J. Milligan, H. I. Lips, C. Castaldini, and R. S. Merrill. Dec 79, 500p EPA-600/7-79-178F
Contract EPA-68-02-3101
See also PB80-150873.

The report gives results of an assessment of current and developing combustion modification NOx control technology for coal-, oil-, and natural-gas-fired industrial boilers. Control effectiveness and applicability, reliability and availability, process impacts, capital and operating costs, energy impacts, and environmental impacts are evaluated. Currently available techniques are capable of moderate (10-25%) NOx reductions for coal- and residual-oil-fired boilers and major (40-70%) reductions for distillate-oil- and gas-fired units with minimal adverse operating impacts. Combustion modifications are estimated to increase the cost of steam by only 1-2%, but could increase the initial capital cost of a boiler by 1-20%. Analysis of measured or postulated incremental emissions, other than NOx, indicates that these emissions are generally unaffected when preferred NOx controls are implemented, although further testing is warranted.

PB80-177322 PC **A07**/MF **A01**
Monsanto Research Corp., Dayton, OH.
Source Assessment: Textile Plant Wastewater Toxics Study, Phase II.
Final rept. Aug 77-May 79,
J. R. Klieve, and G. D. Rawlings. Dec 79, 141p MRC-DA-984, EPA-600/2-79-019I
Contract EPA-68-02-1874
See also Phase I, PB-280 959.

The report gives results of a study concerned with BATEA for the textile manufacturing industry. The level of removal of specific toxic pollutants and toxicity (measured by results of bioassays) attained by selected tertiary systems treating secondary effluents from textile plants was examined. Tertiary treatment systems (unit processes arranged in various ways) were ranked according to their apparent capabilities for removing specific toxic pollutants and toxicity. Unit processes used included flocculation/sedimentation, multimedia filtration with and without precoagulation, granular activated carbon adsorption, and ozonation.

PB80-177363 PC **E03**/MF **E03**
International Inst. for Applied Systems Analysis, Laxenburg (Austria).
On the Monetary Value of an Ecological River Quality Model.
Final rept.,
H. Stehfest. c1978, 31p RR-78-1

A problem widely discussed in the field of water resources research is the degree of complexity a water quality model should have if it is used for water quality management. In the present work this problem is investigated by means of an example. An optimal control problem for river quality is solved for both a simple Streeter-Phelps model and a more complex ecological model. Through decision theoretical arguments it is shown how the two optimal solutions can be compared in a rational way. As in previous IIASA reports on the application of systems theory and operation research to river quality management, the methodologies described are applied to a section of the Rhine River in the Federal Republic of Germany. (Copyright (c) 1978 International Institute for Applied Systems Analysis.)

PB80-177413 PC **A11**/MF **A01**
Acurex Corp., Mountain View, CA. Energy and Environmental Div.
Pilot Scale Combustion Evaluation of Waste and Alternate Fuels: Phase III, Final Report.
Rept. for Feb-Aug 78,
R. A. Brown, and C. F. Busch. Mar 80, 227p EPA-600/7-80-043
Contract EPA-68-02-1885
See also report on Phase 2 dated Jun 79, PB-299 325.

The report gives results of three studies at EPA's Multifuel Test Facility. The first evaluated a distributed-air staging concept for NOx control in pulverized-coal-fired systems. The second evaluated combustion control techniques and NO emissions when firing coal/oil mixtures. The third evaluated emissions and combustion characteristics of refuse-derived fuel (RDF) co-fired with either natural gas or pulverized coal.

PB80-177454 PC **A05**/MF **A01**
Industrial Environmental Research Lab.-Cincinnati, OH.
Oil Spill Debris - Where to Put the Waste.
Final rept.,
John S. Farlow, Russell Wilder, and Corrielia Potter. Jan 80, 98p EPA-600/7-80-016
Prepared in cooperation with New England River Basins Commission, Boston, MA.

This report is a digest of a workshop on disposal of oil spill debris. Representatives of five New England states and New York agreed that oil spill cleanup and disposal of debris is a major regional problem which must be addressed by identifying disposal sites in advance of major oil spills. The workshop provided a forum for discussion of state oil spill clean up and disposal and EPA's policies and plans for regulating clean up operations. A representative from each of the six states reviewed existing laws and regulations governing oil-debris stockpiling, transportation to disposal sites, and the relation between state and local ordinances on liability for disposal costs. Ultimate responsibility for oily debris transportation and disposal varies from state-to-state, and this in turn affects approaches to identifying acceptable disposal sites.

PB80-177561 PC **A07**/MF **A01**
Instytut Ksztaltowania Srodowiska, Katowice (Poland). Environmental Pollution Abatement Centre.
Development of Methods and Techniques for Final Treatment of Combined Municipal and Textile Wastewater Including Sludge Utilization and Disposal.
Final rept.,
Jan Suschka. Dec 79, 149p EPA/600/2-79/160
Grant EPA-PR-05-532-2 (PL-480)

The investigations were carried out on laboratory scale, employing various mixtures of dyeing and municipal wastewaters. The processes studied were: coagulation, ozonization, chlorination, activated carbon, activated sludge, and anaerobic digestion. Lime appeared to be the best coagulation agent. Feasibility of lime reclamation by recalcining the sludge and recycling the lime in the coagulation process was demonstrated.

PB80-177660 PC **A13**/MF **A01**
Crain and Associates, Menlo Park, CA.
The LIFT: Special Needs Transportation in Portland, Oregon.
Final rept. Oct 76-Jun 79,
Thomas A. Cooper, Jr., Sydwell Flynn, and Pamela Bloomfield. Aug 79, 297p UMTA-OR-06-0004-79-1
Contract DOT-TSC-1081
See also report dated Jun 78, PB-294 711.

The report contains results of the evaluation of the Lift. The purpose of the UMTA Service and Methods Demonstration was to test a transit operator's ability to provide demand responsive transportation to handicapped and elderly persons and coordinate this service with contracting social service agencies. Project operation and development, costs, impacts, workability, and cost-effectiveness are discussed in this report. The demonstration proved that a transit operator can coordinate with social service agencies to serve their clients and extend coverage to other transportation handicapped persons who did not previously have access to public transportation. In addition, the project had a substantial impact on the travel behavior of regular users and achieved a high penetration of the wheelchair market.

PB80-177900 PC **A04**/MF **A01**
Geological Survey, Albuquerque, NM.
Experimental Salinity Alleviation at Malaga Bend of the Pecos River, Eddy County, New Mexico.
Water resources investigations (Final),
John S. Havens, and D. W. Wilkins. Dec 79, 73p USGS/WRI-80-4, USGS/WRD/WRI-80/022

Upward-leaking brine, from a confined aquifer at the base of the Rustler Formation, mixes with fresher water in a shallow aquifer, resulting in discharge to the Pecos River in southern Eddy County, New Mexico, of about 0.5 cubic feet per second of saturated brine. Pumping brine from the aquifer at a rate greater than 0.5 cubic feet per second lowered the potentiometric head in the confined aquifer. From July 22, 1963 through December 1968, approximately 3,878 acre-feet of brine had been pumped. Total brine storage in July 1968 was 540 acre-feet, including about 200 acre-feet of salt precipitate. From 1963 to 1988, water downgradient of the storage depression increased in chloride concentration by amounts ranging from 1,500 to 99,400 milligrams per liter, and water levels near the depression increased over 3 feet. For water years 1952-63, the Pecos River gained about 240 tons per day of chloride in the reach from Malaga gaging station to Pierce Canyon Crossing.

PB80-178288 PC **A99**/MF **A01**
GCA Corp., Bedford, MA. GCA Technology Div.
Technology Assessment Report for Industrial Boiler Applications: Fluidized-bed Combustion.
Final rept. Jun 78-Jul 79,
C. W. Young, J. M. Robinson, C. B. Thunem, and P. F. Fennelly. Nov 79, 633p EPA-600/7-79-178E
Contract EPA-68-02-2693
See also PB80-174055, and PB80-152606.

The report gives results of an assessment of the applicability of atmospheric fluidized-bed combustion (AFBC) to industrial boilers. It is one of a series of reports to aid in determining the technological basis for a New Source Performance Standard for air pollutant emissions from the boilers. It reviews the development status and performance of SO2, NOx, and particulate control options for AFBC; selects the most promising systems for control; and estimates the cost, energy, and environmental impacts of the most promising systems.

PB80-178619 PC **A05**/MF **A01**
Waste and Land Systems, Inc., Fort Collins, CO.
Computer Analysis of Seepage and Groundwater Response Beneath Tailings Impoundments,
Lyle A. Davis. 8 Apr 80, 96p NSF/RA-800054
Grant NSF-DAR79-17109

Research was undertaken to determine the possibility of using a computer model to estimate the seepage rates from tailings impoundments. The tailings must be disposed of in an environmentally acceptable manner. Techniques developed by others were modified and combined with an existing computer model for saturated groundwater flow. This computer program is capable of simulating seepage from the impoundment, groundwater response beneath the impoundment, and the effects of previous seepage on the calculation of the subsequent seepage rate. The model, is general, allowing for spatial variations of hydraulic properties, complex impoundment geometry, and arbitrary initial conditions. The model analyzed a few simple problems with encouraging results and acceptable data requirements.

PB80-178734 PC **A08**/MF **A01**
Public Technology, Inc., Washington, DC.
Methodology Study of an Urban Technology System.
Final rept.,
Myron A. Olstein, and J. L. Mercer. 16 Jul 73, 158p NSF-RA-R-73-034
Contract NSF-C791

The Urban Technology System (UTS) was created to investigate the barriers and incentives associated with the innovation process in state and local governments. The report, a culmination of over one year's efforts by UTS, includes the following: A review of initial steps taken to organize methods of investigation; an experimental design; site selection guidelines; back-up site selection guidelines; methods of data acquisition; and a bibliography. The appendices contain a detailed presentation of the experimental design; a non-parametric analysis of data; a site selection computer program; a questionnaire outline with pretest findings; a program advisory group summary; and a project work plan.

PB80-178759 PC **A09**/MF **A01**
Bowdoin Coll., Brunswick, ME.
The Benefits of Air and Water Pollution Control: A Review and Synthesis of Recent Estimates.
Final rept.,
A. Myrick Freeman, III. Dec 79, 191p
Contract EQ9B59

Objectives of this study are to provide a critical review of previous studies which have attempted to estimate air and water pollution control benefits in monetary terms or which might provide an empirical basis for such an estimate; to explain why the estimates are so different; to recalculate benefit estimates whenever possible on the basis of common assumptions concerning price level, base period, degree of cleanup, and imputed values in order to compare the different estimates.

PB80-178767 PC **A06**/MF **A01**
North Carolina Agricultural Experiment Station, Raleigh.
A National Program for Assessing the Problem of Atmospheric Deposition (Acid Rain).
Final rept.,
J. N. Galloway, E. B. Cowling, E. Gorham, and W. W. McFee. Dec 78, 103p
Contract EQ7AD500

The objectives of this report are to assess the present scope of available knowledge about atmospheric deposition and its effects on agricultural lands, forests, ranges, parks, surface waters, and aquatic life in the United States and to recommend a coordinated program of research and monitoring necessary to intelligent management of atmospheric emissions and for the amelioration of the adverse effects of atmospheric deposition on plant and animal life.

PB80-178775 PC **A13**/MF **A01**
Peat, Marwick, Mitchell and Co., Washington, DC.
The UMTA Rail Modernization Program: Evaluation of the Impacts of Section 3 Capital Grants for Rail Rehabilitation and Modernization, 1965-1977.
Final rept.,
John Bennett. May 79, 282p UMTA-IT-06-0118-80-1, UMTA-UPP-79-8

The report is an evaluation of the Urban Mass Transportation Administration grants for the mod-

ernization of existing rail systems. From the beginning of the Section 3 Capital Grant Program through May 31, 1977, Section 3 grant approvals amounted to approximately $6.2 billion. Of this total, $1.7 billion, or 28 percent was approved for the rehabilitation, replacement and upgrading of existing rail systems. The report contains an inventory of rail modernization projects by type, mode (rapid rail, light rail, and commuter rail), and city. Impacts of these funds are analyzed by examining several specific projects in detail. In addition to the examination of project impacts, the process used by two transit operators (NYCTA and PATH) to secure rail modernization funds and to select and implement projects is discussed.

PB80-178783 PC **A17**/MF **A01**
Radian Corp., Austin, TX.
Integrated Assessment of Texas Lignite Development. Volume I. Technical Analyses.
May 79, 383p EPA-600/7-79-111A
Grant EPA-R-806359-01
Sponsored in part by Department of Energy, Washington, DC., and Texas Energy Advisory Council, Austin.See also Volume 2, PB80-178791.

This report contains the results of a project to assess the probable impacts of expected future development of Texas lignite resources. This multi-disciplinary, policy-oriented study considered possible lignite extraction and utilization options through the year 2000. The research team attempted to identify and characterize the major environmental, socio-economic, public health and institutional impacts which could result from this process and the policy issues created or aggrevated by these impacts. Alternative solutions to policy problems are outlined with probable consequences of each. Volume I contains Technical Analyses, including: evaluation of the potential for use of lignite, the likely siting patterns of lignite facilities, and the environmental and socio-economic impacts of lignite use.

PB80-178791 PC **A09**/MF **A01**
Radian Corp., Austin, TX.
Integrated Assessment of Texas Lignite Development. Volume II. Policy Analyses.
May 79, 186p EPA-600/7-79-111B
Grant EPA-R-806359-01
See also Volume 1, PB80-178783. Sponsored in part by Department of Energy, Washington, DC., and Texas Energy Advisory Council, Austin.

Volume II contains Policy Analyses which identify major public policy issues related to lignite use in Texas, and discuss the alternative policies available for resolving the issues.

PB80-178924 PC **A06**/MF **A01**
Meta Systems, Inc., Cambridge, MA.
Deposit and Bounty Systems for Controlling the Discard of Durable Goods and Hazardous Items in Post-Consumer Waste Flows,
Paul Ginberg, Nov 78, 104p
Contract EQ8AC014

This report is a study of the use of deposit-refund and bounty systems to help control the flow of durable goods and hazardous items in post-consumer waste flows. Under such systems, the refund or bounty is used to induce individual consumers to conform to a desired waste control practice. This study examines the objectives and effects of deposit-refund and bounty systems and discusses the major design issues that must be resolved in order to implement these systems. Ten different products or product groups are examined with respect to the probable effects of using a deposit-refund or bounty system.

PB80-179062 PC **A07**/MF **A01**
Vought Corp., Dallas, TX.
AIRTRANS Urban Technology Program, Phase II. Volume 4: Vehicle Fabrication, Tests and Demonstration.
Final rept.,
S. B. Gerald. Oct 79, 138p UMTA-TX-06-0020-79-5
See also Executive Summary, PB80-179070, and Volume 5, PB80-157704.Sponsored in part by Dallas/Fort Worth Regional Airport Board, TX.

The AIRTRANS system at the Dallas/Fort Worth Airport, Texas, is representative of automated guideway transit (AGT) as it will likely develop in cities in the United States and around the world. AIRTRANS has provided transit service for passengers at the airport since January 1974. The system is operating with a high percentage of availability and degree of passenger acceptance. The report describes the fabrication, test and demonstration activities of the AIRTRANS Urban Technology Program. Improvements to the AIRTRANS AGT system in speed, reliability, cost, and all-weather capability for urban application have been evaluated. The primary objective of fabrication was to convert the Phase I test vehicle (T365) into a prototype AGT system suitable for urban application. Vehicle tests were made to evaluate and verify system and subsystem designs. Demonstration and revenue operations were accomplished at the airport. Detailed results of the above activities, conclusions, and implications for urban usage are presented.

PB80-179070 PC **A03**/MF **A01**
Vought Corp., Dallas, TX.
AIRTRANS Urban Technology Program: Executive Summary.
Final rept. Jan 77-Dec 79,
W. C. Albach. Feb 80, 32p UMTA-TX-06-0020-79-8
See also report dated Oct 79, PB80-179062. Sponsored in part by Dallas/Fort Worth Regional Airport Board, TX.

The AIRTRANS system at the Dallas/Fort Worth Airport, Texas, is representative of automated guideway transit (AGT) as it will likely develop in cities in the United States and around the world. AIRTRANS is composed of 13 single-lane miles of concrete guideway connecting 53 stations in 6 major terminal and parking areas of the airport. There is a fleet of 68 fully automatic electrically propelled vehicles, 59 of which currently operate over this guideway network. As of December 1979, the system had completed more than 19 million vehicle miles and carried 29 million passengers. The system is operating with a high percentage of availability and degree of passenger acceptance. This report summarizes the AIRTRANS Urban Technology Program (AUTP) performed under a federal grant from UMTA to the Dallas/Fort Worth Airport Board. Improvements to the AIRTRANS AGT technology in speed, passenger acceptance, cost, reliability, and all-weather capability for urban applications have been made and evaluated during the program.

PB80-179112 PC **A04**/MF **A01**
Aerospace Corp., El Segundo, CA. Energy and Resources Div.
Oil Shale Mining Environmental Research Program Overview.
Final rept. Sep 78-Jun 79,
C. Ogasawara, G. F. Kuncir, and D. A. Lewis. Jun 79, 64p BUMINES-OFR-58-80
Contract J0255030

This report describes the direction and progress of the Bureau of Mines Oil Shale Mining Environmental Research Program as of January 31, 1979. The report focuses on the Bureau's role in environmental research supporting oil shale development with respect to the activities of other involved Government agencies and private industry. Environmental considerations in oil shale extraction, such as ecological disturbances, health and safety hazards, waste management, and socioeconomic impacts, are discussed along with the type of research known to be planned by organizations to ameliorate these problems.

PB80-179138 PC **A07**/MF **A01**
Colorado School of Mines Research Inst., Golden.
Natural Cementation of Retorted Oil Shale.
Final rept. Feb 78-May 79,
Clifford B. Farris. May 79, 131p BUMINES-OFR-54-80
Contract J0285001

Retorted oil shale possesses an inherent cementation characteristic which develops when the shale is moistened, compacted, and cured. The degree of strength is strongly dependent upon retorting temperature, residence time, and mode of bed heating. A high natural cementation strength can be beneficial in reducing costs of surface disposal of retorted shale, in using retorted shale as an engineering construction material, and possibly in reducing water pollution. The natural cementation strength of retorted oil shale is the focus of this investigation. The optimum retorting temperature and residence time to obtain natural cementation strength in retorted Green River oil shale from western Colorado were determined.

PB80-179286 PC **A07**/MF **A01**
TRW Systems and Energy, Redondo Beach, CA.
Development Study of a Novel Continuous-flow Impactor.
Final rept. Jul 76-Nov 78,
E. F. Brooks, N. Gat, M. E. Taylor, T. E. Chamberlain, and R. J. Golik. Jan 80, 127p EPA-600/7-80-014
Contract EPA-68-02-2165

The report gives results of a development study involving feasibility verification of a novel particle impactor in which the impaction surface is the interface between two opposing jets. Particles (which would impact a solid surface in a standard impactor) cross the interface between the aerosol-laden gas and a previously particle-free gas, are entrained in the latter, and are conveyed out for analysis. Work consisted of an initial literature search and analysis to determine the likelihood of success, followed by design, fabrication, and testing of a laboratory unit. A good particle separation capability was demonstrated. Upon completion of the laboratory tests, a design effort showed the feasibility of a staged in situ particle monitoring subsystem to give semicontinuous (nominal 1 minute cycle time) output of particle size distribution, among other applications.

PB80-179302 PC **A10**/MF **A01**
Washinton State Univ., Pullman. Air Resources Section.
Ambient Hydrocarbon and Ozone Concentrations Near a Refinery, Benicia, California, 1975.
Final rept.,
Ken Sexton, and Hal Westberg. Feb 80, 214p EPA-600/7-80-028
Contract EPA-68-02-2239

As part of an effort to characterize airborne emissions from petroleum refineries, an ambient air monitoring study was conducted near the Exxon refinery at Benicia, California, during September 8-22, 1975. Ground-level sampling facilities and an airplane equipped with air pollutant monitoring instruments provided an integrated, three dimensional monitoring network. Measurements included ozone, oxides of nitrogen, methane, carbon monoxide, individual C2-C6 hydrocarbons, halocarbons, condensation. Increased concentrations of hydrocarbons, carbon monoxide, condensation nuclei and nitrogen oxides, as well as decreased ozone levels were observed less than five miles from the refinery. At distances greater than 5 miles, elevated condensation nuclei and hydrocarbons were still observed but no discernible differences from background could be detected in NOx, O3, and CO.

PB80-179344 PC **A06**/MF **A01**
State Univ. of New York Coll. of Environmental Science and Forestry, Syracuse.
Toxicity Reduction Through Chemical and Biological Modification of Spent Pulp Bleaching Liquors.
Final rept. 21 Sep 76-20 Sep 79,
Carlton Dence, Chun-Juan Wang, and Patrick Durkin. Jan 80, 113p EPA-600/2-80-039
Grant EPA-R-804779

Chlorophenols similar to or identical with those detected in spent chlorination and caustic extraction liquors were synthesized and tested over a range of concentrations to determine their effect on the growth of several fungi, an alga (Chlorella pyrenoidosa) and duckweed (Lemna perpusilla) and on the survival of Daphniamagna. Biological treatment of the chlorophenols consisted of the application of pure cultures of three different fungi and a mixed microbial population for periods ranging up to 15 days. Degradation varied widely among the various phenols and for the same phenol treated with different fungi. Spent chlorination and caustic extraction liquors were subjected to a variety of chemical treatments and the resulting effects on acute toxicity determined. Treatment with elemental chlorine, hypochlorous acid, hypochlo-

rite, ozone and hydrogen peroxide produced increases in the toxicity of the spent liquor. Biological treatment of spent chlorination and caustic extraction liquors involved the application of a fungus (Candida utilis), an unidentified bacterium, and a mixed microbial population, together with supplemental carbon sources. Toxicity reduction through modification of conventional chlorination and caustic extraction bleaching stages was also evaluated.

PB80-179351 PC **A10**/MF **A01**
City Coll., New York. Dept. of Electrical Engineering.
Remote Monitoring of Gaseous Pollutants by Differential Absorption Laser Techniques.
Final rept. Jun 74-Jun 78,
S. A. Ahmed, J. S. Gergely, and F. Barone. Feb 80, 217p EPA-600/2-80-049
Grant EPA-803109

A single-ended laser radar (LIDAR) system was designed, built, and successfully operated to measure range-resolved concentrations of NO2, SO2, and O3 in the atmosphere using a Differential Absorption of Scattered Energy (DASE) LIDAR technique. The system used a flash-lamp pumped dye laser as the primary source of laser energy. For the NO2 measurements, the dye laser output was used directly in a novel simultaneous two wavelength output mode in which two wavelengths, one on and one off the resonance absorption of NO2 molecules are transmitted simultaneously and the relative attenuation determined for the two backscattered signals detected. This mode of operation effectively reduces errors due to scintillation and aerosol drift. For the SO2 and O3 measurements, it was necessary to frequency double the output of the dye laser to match the absorption spectra of the SO2 and O3 molecules. Field measurements, which were carried out over the Upper East Side of Manhattan for all three pollutants, produced range-resolved concentrations at ranges of over two kilometers.

PB80-179369 PC **A20**/MF **A01**
Radian Corp., Austin, TX.
Proceedings: Symposium on Atmospheric Emissions from Petroleum Refineries (November 1979, Austin, TX).
Rept. for Aug-Dec 79,
Donald D. Rossbrook. Mar 80, 453p EPA-600/9-80-013
Contract EPA-68-02-2608

The proceedings are a compilation of papers, formal discussions, and question and answer sessions from the Symposium. The symposium focused on results of the petroleum refining environmental assessment program conducted by Radian Corporation. The 4-year program included extensive sampling of atmospheric emissions in 13 oil refineries throughout the U.S. Papers were presented on emissions measurement, quality control, and analysis and application of results. Emphasis was on fugitive emissions. Formal discussions of each paper were provided: discussors included petroleum industry representatives, environmental consultants, and state environmental regulatory personnel. Each paper and formal discussion was followed by a question and answer session between the audience and the presenter.

PB80-179831 PC **A03**/MF **A01**
SRI International, Menlo Park, CA.
Continuing Analysis of Multipoint Rollback as Applied to Copper Smelters in the State of Arizona.
Final rept.,
Richard H. Thuillier, and Harold S. Javit. Mar 80, 38p EPA-909/9-80-001
Contract EPA-68-01-4137

On 4 January 1978, the U.S. Environmental Protection Agency (EPA) promulgated a final rule for the control of sulfur oxide (SOx) emissions at existing nonferrous smelters in the State of Arizona, imposing a maximum emission limitation for each smelter as a 6-hour running mean. Emission limits, determined from a 1973-74 data base, were set by proportionally 'rolling back' the 24-hourly average smelter emissions, estimated by sulfur balance or other methods, for the day on which the maximum 3-hour-average ambient concentration of sulfur dioxide was observed. In response to the EPA rule, the State of Arizona has proposed an alternative approach to calculating copper smelter emission limits based on a statistical model. This new approach is known as 'multipoint rollback' and is based upon rollback of the entire distribution of emissions at the smelter. EPA's Region IX Office determined the need for technical assistance in evaluating Arizona's proposed method, and contracted with SRI International (SRI) for an objective evaluation.

PB80-180029 PC **A22**/MF **A01**
Syracuse Research Corp., NY.
Adoption and Utilization of Urban Technology: A Decision-Making Study. Case Studies of Innovation in Syracuse, New York. Part 5.
Final rept.,
W. Henry Lambright, Albert H. Teich, James D. Carroll, Marguerite Beardsley, and Thomas Dorsey. Sep 77, 512p SRC-TR-77-513-PT-5, NSF/PRA-7519704/5
Grant NSF-PRA75-19704
See also Part 4, PB-284 604. Continuation of Grant NSF-RDA75-19704.

The report describes and analyzes the efforts made by a number of urban agencies to adopt and implement innovative strategies in delivering public services and solving local problems. The case studies include the following agencies and services: Syracuse Campus Plan, The Syracuse Fire Department, Housing, Syracuse Police Department, Solid Waste Management, Syracuse Dial-A-Bus, Property Assessment, and Cable TV.

PB80-180037 PC **A09**/MF **A01**
International Ozone Association, Cleveland, OH.
Ozone for Industrial Water and Wastewater Treatment, An Annotated Bibliography.
Final rept. Jul 74-Jul 77,
Rip G. Rice, and Myron E. Browning. May 80, 198p EPA/600/2-80-142
Grant EPA-R-803357
Prepared in cooperation with Jacobs Engineering Group, Washington, DC. and Allied Chemical Co., Syracuse, NY.

The project explored the technology of ozonation applicable to industrial water and wastewater treatment. The final report documents existing equipment, extent of application and practical usage, contract systems, monitoring and detection devices, general and specific economics, and most recent acceptable procedures.

PB80-180466 PC **A02**/MF **A01**
Environmental Monitoring and Support Lab., Research Triangle Park, NC.
The Role of Quality Assurance in Collaborative Testing,
William J. Mitchell. Jul 79, 4p EPA-600/J-79-068
Pub. in Jnl. Air Pollution Control Association, p708-709 Jul 1979. Presented at APCA/ASQC Conference, Held at New Orleans, LA on Mar 12-14, 1979.

Collaborative testing is the traditional means used to establish the precision of test methods. The role that quality assurance plays in the collaborative testing of U.S. Environmental Protection Agency stationary source test methods is presented. The applicability of the quality assurance procedures presented for routine use in compliance testing is also described.

PB80-180490 PC **A03**/MF **A01**
Kentucky Water Resources Research Inst., Lexington.
An Avoidance Response Bioassay for Aquatic Pollutants.
Research rept.,
Jeffrey A. Black, and Wesley J. Birge. 1980, 43p RR-123, W80-04806, OWRT-A-077-KY
Contracts DI-14-34-0001-8019, DI-14-34-0001-9019

Avoidance response bioassays were conducted with eight aquatic contaminants, including cadmium, copper, mercury, zinc, chloroform, dio ctylphthalate (DOP), trisodium nitrilotriacetic acid (NAT), and phenol. Tests were performed in a dual-channel fluviarium system, and the toxicant injection procedure used provided good regulation of exposure concentrations. Juvenile stages of largemouth bass (Micropterus salmodes), bluegill, sunfish (Lepomis macrochirus), and rainbow trout (Salmo gairdneri), and tadpoles of the American toad (Bufo americanus) proved to be suitable animals for evaluating avoidance or attraction responses. The trout was the most sensitive species tested. Avoidance was significant in tests with cadmium, phenol, and zinc, and significant attraction resulted from exposures to chloroform, DOP, and mercury. Animals generally avoided lower concentrations of copper but were attracted to higher exposure levels.

PB80-180508 PC **A05**/MF **A01**
Washington Univ., Seattle. Coll. of Forest Resources.
Suspended Sediment from Forest Road Construction.
Project completion rept.,
David D. Wooldridge, and Arthur G. Larson. Jan 80, 82p W80-04808, OWRT-A-088-WASH(1)
Contract DI-14-34-0001-8051

Concentrations and total quantities of suspended sediment in portions of Fly Creek, an undisturbed tributary of the Clearwater River in western Washington, were studied during the construction of 1.4 miles of unpaved forest road in the watershed. Fly Creek is a Class A, Excellent, stream with a watershed of 649 acres. Approximately 90% of the 140 to 200 inches of annual precipitation becomes streamflow. The road was constructed in accordance with the Best Management Practices defined by the Washington State Forest Practices Rules and Regulations.

PB80-180516 PC **A10**/MF **A01**
Voorhees (Alan M.) and Associates, Inc., McLean, VA.
Dual Mode Planning Case Study, Orange County. Volume 1: Executive Summary and Planning Analysis.
Final rept.,
P. Costinett, W. G. Hansen, and J. O'Doherty. Jun 77, 211p UMTA-VA-06-0030-80-1
Contract DOT-UT-40029
See also Volume 2, PB80-180524. Prepared in cooperation with Dave Systems, Inc., San Francisco, CA., DTM, Inc., Bethesda, MD., and VTM, Inc.

The volume is one of five which document two separate planning case studies examining the feasibility of dual mode transit systems in (1) Orange County, California, and (2) Milwaukee, Wisconsin. The main objective of this case study was to provide feedback to dual mode system design efforts. Before the dual mode system development proceeded to large-scale demonstration and testing, cost, performance, and demand relationships needed to be investigated analytically so that efficient design characteristics and operating regimes could be prescribed. The study incorporated a full-fledged technical planning analysis in a real urban area assuming that the required dual mode vehicles and control systems were available. Supply and demand relationships were parameterized so that the impacts of variations in factors such as access/egress time, guideway speed, headways, fare level, vehicle size, etc., can be determined.

PB80-180524 PC **A17**/MF **A01**
Voorhees (Alan M.) and Associates, Inc., McLean, VA.
Dual Mode Planning Case Study, Orange County. Volume 2: Methodology.
Final rept.,
P. Costinett, W. G. Hansen, and J. O'Doherty. Jun 77, 381p UMTA-VA-06-0030-80-2
Contract UMTA-UT-40029
See also Volume 1, PB80-180516. Prepared in cooperation with Dave Sytems, Inc., San Francisco, CA., DTM, Inc., Bethesda, MD., and VTM, Inc.

The objectives of this case study are: To provide a feedback to the design effort covering potential problems, critical parameters, and the cost effectiveness of alternative configurations and operating strategies; To produce a documented planning methodology in a 'how-to' vein which would be transferable to others for the purpose of planning for such transit systems; and To exercise the UMTA Transportation Planning System (UTPS) of planning software, to identify and overcome any weaknesses in the software, and to document this for others.

PB80-180573 PC A06/MF A01
Kennedy Engineers, Inc., San Francisco, CA.
Scientific and Technical Evaluation of the Environmental Protection Agency's Wastewater Treatment Facilities Grants Planning Process - Boston Case Study. Executive Summaries.
Apr 79, 105p
Contract EQ7AC015, Grant NSF-PRA76-81772
See also report dated Jan 79, PB-296 551. Prepared in cooperation with Environmental Research and Technology, Inc., Concord, MA., and Urban Systems Research and Technology, Inc., Concord, MA.

Executive summaries of four contractor reports comprising a Federally-sponsored study examining recent operation of EPA's Construction Grants Program, using the Boston Metropolitan Area as a case study for developing recommendations for legislative and administrative actions at the national level. Analyzed are a number of aspects of facilities planning and design, including alternative approaches to wastewater and sludge management, facilities location and design alternatives, effects on the quality of receiving waters and other environmental effects, costs to municipalities and to industrial and residential water users, and the relationships between planning for wastewater treatment facilities and planning for other local considerations.

PB80-180631 PC A04/MF A01
Department of Transportation, Washington, DC. Office of Technology Sharing.
Working Paper on the Transportation of Hazardous Materials Project of the DOT Technology Sharing Program.
Final rept. Jan-Mar 80,
Michael M. Siviy. Apr 80, 56p DOT-I-80-13

The paper summarizes the initial work of the Technology Sharing Program in the hazardous materials area. By no means a conclusive study on the topic, this paper is an information document that will be used as a basis for further study. The paper gives a brief introduction to hazardous materials transportation, and why there is currently great interest in this topic by state and local elected and appointed officials. It describes the major areas of hazardous materials transportation, and the major actors in the field (both government and non-government). The major issues concerning hazardous materials transportation as seen by state and local officials are presented, as well as a brief analysis of these issues.

PB80-180730 MF A01
Faucett (Jack) Associates, Inc., Chevy Chase, MD.
Transportation Projections, 1985, 1995, 2000.
Final rept.,
Carl Woehlcke, and Jack G. Faucett. Jan 80,
150p JACKFAU-78-152-2, DOT-OST-P10-80-2
Contract DOT-OS-60121
Available Microfiche only because of poor quality.

The report presents projections of transportation activities to 1985, 1995 and 2000 for three economic scenarios. These projections were made using The Department of Transportation (DOT) Long-Range Forecast Model developed for DOT. The transportation activity projections cover the 31 for-hire and private modes of the model. The scenarios are described in terms of economic growth, transportation policies and energy policies. The transportation submodel produces projections of domestic intercity freight flows for 48 commodity groups for all modes expressed in tons, ton-miles, and revenues. The modal split in these projections changes with time and with changes in relative modal costs. An energy efficiency submodel calculates fuel use by each mode in response to changes in fuel prices. Changes in fuel prices are translated into changes in relative modal costs, which affect the modal split for freight. Other changes in relative modal costs may be specified as inputs to the model.

PB80-180755 PC A09/MF A01
Washington Center for Metropolitan Studies, DC.
Study of the Costs of Regional System Mismatches.
Aug 77, 189p NSF/RA-770448
Grant NSF-ISP76-02777

The project is concerned with a study of regional productivity which concluded that any basic improvement in the overall performance of metropolitan regions would require in each region: (1) a regional citizens' organization capable of raising the basic issues concerning the community's long-term development; and (2) a public policy body capable of resolving these issues and guiding the development and operation of basic services for the region as a whole. Included in this document is a justification for a 10-year effort to 'put the regional house in order'. In order to identify the full costs of inaction, additional experienced judgments on the principal categories and causes of the 'costs of doing nothing' about regional decision making are assembled. Findings emphasizing the importance of costs attributable to mismatches among the entire complex of regional systems spurred the development of a preliminary matrix of basic systems to suggest the types and degrees of system interaction.

PB80-180763 PC A16/MF A01
Purdue Univ., Lafayette, IN.
Multi-Functional Building Concepts and Analyses, A Collection of Papers.
Jan 74, 365p NSF-RA-S-74-111
Grant NSF-GI-34978

Thirteen reports dealing with specialized aspects of a project designed to measure the impact of multi-functional building on an urban environment are presented. The original intent of this program was to bring together researchers from different relevant engineering disciplines to conduct an interdisciplinary research effort on a societal problem. Since the project was terminated midway, the integrative phase did not materialize, and papers on the following topics represent the outcome of the project: multi-functional buildings concepts and analysis; political and social assessments of multi-use buildings; implications of multi-functional buildings for the modern city, voting and politics; cities within a city; social aspects of self-containment; effects of residential building type on consumption of energy; a simulation study of energy consumption by elevators in tall buildings; stochastic models of tenant vacancies; trip distribution models; and burglary resistance.

PB80-180847 PC A06/MF A01
Battelle Columbus Labs., OH.
Evaluation of 'Within-Vessel' Sewage Sludge Composting Systems in Europe.
Final rept. Feb-Jun 78.
Dec 79, 111p BATT-G-7016-0001, EPA-600/2-79-088
Contract EPA-68-03-2662

The objectives were: (1) To update a review of the state of the art of sewage sludge composting in Europe; (2) to evaluate a European-designed, continuous, thermophilic, mechanical, aerobic, composting system in Germany; and (3) to compare its cost to those of the U.S. Department of Agriculture's Beltsville static-pile, aerated composting system. This report addresses the general characteristics of the European composting systems and a bioreactor in Hochheim am Main, West Germany.

PB80-180888 PC A03/MF A01
Delaware Univ., Newark. Water Resources Center.
The Use of the Water Budget in Evaluating Leaching Through Solid Waste Landfills,
John R. Mather, and Patricia A. Rodriguez. Oct 78, 50p CONTRIB-25, W80-04875, OWRT-A-040-DEL(3)
Contract DI-14-34-0001-9008

Determination of the volume of leaching through solid waste landfills is a problem of concern to landfill operators everywhere since such leaching may carry pollutants into the local groundwater. The use of a simple yet practical climatic water budget model to calculate possible leaching volume under different landfill conditions is explained and illustrated. The water budget model only requires information on air temperature and precipitation as input. All necessary tables and formulas for evaluating the water budget model are included.

PB80-180953 PC A03/MF A01
Lynch (Patrick E.), Springfield, IL.
Economic Impact of Changing Emissions Standards for Explosive Waste Incinerators, R78-9.
Final rept.,
Patrick E. Lynch. Aug 79, 49p IINR-79/15

This report deals with the study of Olin Corporation which owns and operates a facility near Marion, Illinois. They produce waste materials contaminated by explosive chemicals. In order to dispose of the materials while complying with Chapter 2 of the Board's relations, Olin has the following options: (a) incinerate and clean the resulting effluents of particulate matter, (b) landfill, while taking all due precautions with respect to safety hazards, leaching, etc., (c) transport them out of state where they can be disposed in compliance with applicable regulations. Olin has chosen to dispose of such wastes through operation of two thermal incinerators followed by a wet venturi scrubber employing water as the scrubbant medium. The incinerated materials consist of explosive, low carbon wastes requiring large quantities of excess air for their safe, controlled combustion. This high excess air has the effect of diluting carbon dioxide concentrations in the effluent such that when allowable particulate emissions are corrected on the basis of only 12% carbon dioxide, particulate emissions are in violation of Rule 203 (e). Similarity, when carbon monoxide emission are computed, corrected for only 50% excess air, these emissions are in violation of Rule 206 (b).

PB80-181076 PC A02/MF A01
Harvard Univ., Cambridge, MA. Dept. of City and Regional Planning.
Increasing the Productivity of Urban Expressways: Combining TSM (Transportation Systems Management) Techniques and Transit Improvements.
Executive summary (Final), Oct 77-Oct 79,
John F. Kain, and Gary R. Fauth. Oct 79, 13p
UMTA-MA-11-0031-80-2
See also PB80-150568.

This is the second phase of a two-part study, which summarizes an analysis of Transportation Systems Management (TSM) and other low capital cost techniques to increase the productivity of urban expressways and streets in dense, build-up areas. Using CORSIM, a variant of the TASSIM land-use transportation model, this analysis examines the benefits and costs of implementing alternative combinations of TSM techniques and transit improvement policies. In Volume 1, the costs and benefits of implementing four alternative TSM policies in Boston's central area were estimated. This volume focuses on expressway management policies and transit improvements for Boston's Southeast Corridor. Four TSM techniques: a contra-flow lane for buses; a concurrent-flow lane, ramp metering with bus priority, and automobile tolls, are considered in conjunction with five alternative transit systems offering different combinations of travel times and fares. Also, the impacts of a parking surcharge were simulated for all central area commuters, along with the various toll and metering policies. Of the composite policies tested, expressway ramp metering with an average delay of nine minutes, assuming an improved bus transit system charges $0.7 per mile, is the most feasible cost-effective option.

PB80-181134 PC A09/MF A01
North Carolina Univ. at Chapel Hill. Dept. of Environmental Sciences and Engineering.
Treatability and Assessment of Coal Conversion Wastewaters. Phase I.
Final rept. Sep 78-Sep 79,
P. C. Singer, J. C. Lamb, III, F. K. Pfaender, and R. Goodman. Nov 79, 194p EPA-600/7-79-248
Grant EPA-R-804917

The report gives Phase I results of (1) an assessment of the environmental impact of wastewaters originating from the production of synthetic fuels from coal, and (2) an evaluation of alternative technologies for treating these wastewaters. Work on coagulation, adsorption, and preliminary biological treatment studies is continuing. The major focus is on aerobic biological treatment which is projected to be the principal means of removing organic impurities from these wastewaters and a cornerstone of any overall wastewater treatment program. A synthetic wastewater, designed to simulate a real

conversion process wastewater, was fed to a series of aerobic biological reactors. Design and operation of the reactors is described, along with performance data spanning two 6-month operating periods.

PB80-181159 PC **A03**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Research and Development.
Sulfur Oxides Control in Japan,
Charles R. Beek, and Bette Rohse. Nov 79, 28p EPA-600/9-79-043
Sponsored in part by Tennessee Valley Authority, Muscle Shoals, AL. Emission Control Development Projects., Electric Power Research Inst., Palo Alto, CA. Prepared in cooperation with Calculon Corp., Inc., Arlington, VA.Color illustrations reproduced in black and white.

Sulfur oxides are generated from the burning of fossil fuels. In Japan the major source of SO2 pollution is from the burning of heavy fuel oil by the electric power generating plants. The primary methods currently being practiced to control this pollution are flue gas desulfurization (FGD) and burning low sulfur fuels. To evaluate these advances for their potential application in the U.S., the Environmental Protection Agency organized an industry/government task force to visit Japan to obtain first hand information on their experience with FGD systems. The task force members' observations during that trip, their prior knowledge, and information gathered from referenced sources comprise this report. The first section provides an overview of the: Japanese energy status, SO2 pollution emissions control regulations, The general status of FGD applications in the industrial and utility sectors, Comparison of Japanese and U.S. experience. The second section provides detailed technical information on selected FGD installations visited including plant/FGD specifications, performance information and process flow diagrams. An appendix provides further information concerning members of the visiting task force, a listing of plants visited, and numbers and capacities of FGD systems in Japan.

PB80-181225 PC **A05**/MF **A01**
Meteorology Research, Inc., Santa Rosa, CA.
Characterization of Scrubbed and Unscrubbed Power Plant Plumes: Three Case Studies.
Final rept.,
Jeffrey L. Stith, Donald L. Blumenthal, and Jerry A. Anderson. Mar 80, 76p EPA-600/7-80-070
Contract EPA-68-02-2968

Airborne measurements of scrubbed and unscrubbed emissions from the Widows Creek Power Plant were carried out during August 17-25, 1978. The results of the analysis of the measurements taken during three case study days are described.

PB80-181258 PC **A06**/MF **A01**
Vought Corp., Dallas, TX.
AIRTRANS Urban Technology Program, Phase II. Volume 3: Vehicle and Wayside Subsystems.
Final rept.,
W. C. Albach. Oct 79, 123p UMTA-TX-06-0020-79-4
See also Volume 2, PB80-175201. Sponsored in part by Dallas/Fort Worth Regional Airport Board, TX.

AIRTRANS, an Automated Guideway Transit (AGT) system, has provided transit service for passengers at the Dallas/Fort Worth Airport since January 1974. The successful deployment of AGT technology prompted the investigation for the extension of this technology. The report describes the results of the vehicle and wayside subsystem task of the AIRTRANS Urban Technology Program. Improvements to the AIRTRANS AGT system to achieve reduced maintenance cost, increased reliability, improved energy efficiency and all-weather capability for urban applications have been evaluated, analyzed, tested and demonstrated to enhance urban suitability. The demonstration was accomplished by fabricating an urban prototype vehicle and placing it in test operation in the AIRTRANS system at the Dallas/Fort Worth Airport. The prototype vehicle improvements were made in the steering, propulsion, power collection, vehicle coupling, pneumatic, air compressor, door actuation, environmental control and suspension subsystems, and in vehicle maintenance access.

PB80-181266 PC **A06**/MF **A01**
KVB, Inc., Minneapolis, MN.
Field Tests of Industrial Stoker Coal-fired Boilers for Emissions Control and Efficiency Improvement - Site E.
Final rept. Nov 78-Jan 79,
P. L. Langsjoen, J. O. Burlingame, and J. E. Gabrielson. Mar 80, 105p EPA/600/7-80/064A
Contract DOE-EF-77-C-01-2609
See also PB80-119340. Sponsored in part by American Boiler Manufacturers Association, Arlington, VA.

The report gives results of field measurements made on a 180,000 lb/hr coal-fired spreader-stoker boiler. The effects of various parameters on boiler emissions and efficiency were studied. Parameters included overfire air, excess air, boiler load, and coal properties. Measurements included O2, CO2, CO, NO, NO2, SO2, SO3, controlled and uncontrolled particulate loading, particle size distribution of the uncontrolled flyash, and combustible content of the ash. In addition to test results and observations, the report describes the facility tested, coals fired, test equipment, and procedures. This unit was unique: it used paint oven exhaust gases as combustion air. Particulate loading on the unit averaged 5.51 lb/million Btu uncontrolled at high load. Nitric oxide emissions averaged 0.53 lb/million Btu at high load.

PB80-181332 PC **A03**/MF **A01**
Louisiana Dept. of Highways, Baton Rouge. Research and Development Section.
Evaluation of Continuously Reinforced Concrete Pavement.
Research rept. (Final),
Zahir Bolourchi, and William H. Temple. Feb 75, 43p RR-86

This report provides a review of the performance and structural characteristics exhibited on five continuously reinforced concrete pavement projects in the State of Louisiana. The performance characteristics were evaluated by means of the Mays Ride Meter. The structural characteristics were determined by means of the Dynamic Deflection Determination System (Dynaflect). Physical characteristics of cracking and deterioration were visually observed.

PB80-181399 PC **A03**/MF **A01**
Urban Inst., Washington, DC.
A Section 147 Rural Transportation Demonstration Manual. Number 1. Rural Public Transportation Services and Performance.
Final rept.,
Robert McGillivray, Ulrich Ernst, Mary Lou Olsson, and Francine Tolson. Aug 79, 39p DOT-I-79-4
See also Number 2, PB80-181407.
Also available in set of 5 reports PC E13, PB80-181381.

The manual summarizes the lessons that have been learned from the Section 147 Rural Transit Demonstrations about service and fare policies, and performance and costs. The report concludes that rural transit services have to be innovative, combining conventional transit operations with fixed routes and regular schedules with various forms of paratransit, to meet the specific needs of individual areas. The report also emphasizes the need for careful monitoring of costs and system performance as transit services develop. The report provides capsule summaries of system characteristics and performance for selected projects, identified by State.

PB80-181407 PC **A04**/MF **A01**
Ecosometrics, Inc., Bethesda, MD.
A Section 147 Rural Public Transportation Demonstration Manual. Number 2. Planning Rural Public Transportation Systems.
Final rept.,
Jon E. Burkhardt. Aug 79, 71p DOT-I-79-5
See also Number 1, PB80-181399, and Number 3, PB80-181415.
Also available in set of 5 reports PC E13, PB80-181381.

The report describes planning processes used to establish rural transportation, and was prepared by examining planning documents and operating reports of projects funded under the Section 147 Demonstrations. It examines the premise that good planning and management measurably contributes to the potential success of rural transportation projects. The study examines system planning, startup, management, funding and alteration in separate chapters, and concludes with an overall assessment of key factors for success. These include common sense, a good project director, a willingness to change, vehicle utilization, high trips per person, and vehicle miles of service.

PB80-181415 PC **A03**/MF **A01**
Applied Resource Integration Ltd., Boston, MA.
A Section 147 Rural Public Transportation Demonstration Manual. Number 3. Rural Public Transportation Coordination Efforts.
Final rept.,
H. N. Ketola. Aug 79, 45p DOT-I-79-6
See also Number 2, PB80-181407, and Number 4, PB80-181423.
Also available in set of 5 reports PC E13, PB80-181381.

The technical manual discusses coordination and the role it plays in developing successful rural public transportation programs. The report stresses that coordination must begin early, involve as many participants as possible, and be carried forward through the planning, operation, and implementation of a project. Four sections elaborate on coordination with respect to community support, regulatory considerations, the role of public and private operators, and the role of human service agencies.

PB80-181423 PC **A06**/MF **A01**
Michigan Dept. of Transportation, Lansing. Bureau of Urban and Public Transportation.
A Section 147 Rural Public Transportation Demonstration Manual. Number 4. Rural Public Transportation Vehicles.
Final rept.,
Jack Hayes. Aug 79, 104p DOT-I-79-7
See also Number 3, PB80-181415, and Number 4, PB80-181431.
Also available in set of 5 reports PC E13, PB80-181381.

The report examines the various types of vehicles used in the Section 147 Rural Public Transportations, and provides guidelines on vehicle considerations. The report covers specifications, vehicle maintenance, communications equipment, and driver training, and includes example material and suggested methods for each topic. The report finds that a mix of vehicle sizes is normally the best method for purchasing vehicles initially, and sufficient attention has to be provided for back-up vehicles.

PB80-181431 PC **A06**/MF **A01**
Florida State Dept. of Transportation, Tallahassee. Div. of Public Transportation Operations.
A Section 147 Rural Public Transportation Demonstration Manual. Number 5. Marketing Rural Public Transportation.
Final rept.,
Tereasa S. Panebianco. Aug 79, 125p DOT-I-79-8
See also Number 4, PB80-181423.
Also available in set of 5 reports PC E13, PB80-181381.

The report describes how to market transit services in rural and small urban areas. It covers how to set goals and objectives for a marketing program, developing and costing such a program, market research techniques, advertising and promotion approaches, and community relations. The report emphasizes the need to select the correct communications medium in developing a promotion strategy. Techniques described include system maps, discount fares and passes, development of printed schedules, how to ride brochures, and use of radio announcements.

PB80-181456 PC **A05**/MF **A01**
Maine Univ. at Orono. Land and Water Resources Center.
Trace Metals in Suspended Particulates, Biota, and Sediments of the St. Croix, Narraguagus, and Union Estuaries and the Goose Cove Region of Penobscot Bay.
Completion rept.,

L K. Fink, Jr, A. B. Harris, and L. L. Schick. Apr 80, 100p W80-04809, OWRT-A-041-ME(1)

Samples from four Maine estuaries were analyzed to determine the concentrations, distributions, and sources of heavy metals (Ag, Cd, Cr, Cu, Fe, Hg, Mn, Ni, Pb, and Zn) in their suspended particulates, sediments, and biota. The four estuaries studied and their dominant impacting anthropogenic activity are: the St. Croix River, pulp and paper processing; the Narraguagus River, agricultural activity; the Union River, untreated town sewage; and Goose Cove (Penobscot River), mining activity. Sampling sites for each estuary were located both above and below the principal pollution injection sources.

PB80-181605 PC **A02**/MF **A01**
Maritime Administration, Washington, DC.
Great Lakes Traffic and Competition Study. Volume 1 - Executive Report.
Final rept. 1977-2000,
Richard L. Walker. Aug 79, 19p MA-PORT-970-80068
See also Volume 2, PB80-181613.
Also available in set of 3 reports PC E12, PB80-181597.

The overall program is designed to improve the capabilities and market share performance of the Great Lakes and St. Lawrence Seaway systems. The study focuses on the traditional 19-State Great Lakes region, stratifying the States into high-, medium-, and split-penetration areas. To meet the primary objective, the study also creates domestic and international commodity flow data bases, identifies shipper/consignee routing criteria, and examines the impact of least-cost competition and market/institutional factors (stimuli) on market share.

PB80-181613 PC **A11**/MF **A01**
Simat, Helliesen and Eichner, Inc., Washington, DC.
Great Lakes Traffic and Competition Study. Volume II: Final Report.
Rept. for 1977-2000,
John Leeper. Aug 79, 239p MA-PORT-970-80069
See also Volume 1, PB80-181605 and Volume 3, PB80-181621.
Also available in set of 3 reports PC E12, PB80-181597.

The primary objective of the Great Lakes Traffic and Competition Study is to recommend a two-part program of (1) marketing initiatives and (2) institutional changes that can be employed by the Great Lakes maritime community in improving the market share performance of the Great Lakes and St. Lawrence Seaway Systems. In meeting the primary objective of a two-part action program, a number of secondary objectives are addressed. These include the definition of a Great Lakes hinterland, the creation of domestic and international commodity flow data bases, the identification of shipper/consignee routing criteria, and the impact of least-cost competition and market/institutional factors on market share.

PB80-181621 PC **A12**/MF **A01**
Simat, Helliesen and Eichner, Inc., Washington, DC.
Great Lakes Traffic and Competition Study. Volume III: Appendices.
Final rept. 1977-2000,
John Leeper. Aug 79, 275p MA-PORT-970-80070
See also Volume 2, PB80-181613.
Also available in set of 3 reports PC E12, PB80-181597.

Volume of Appendices A-J clarify and supplement the basic analysis. These appendices range from summary analyses to statistical tables and charts.

PB80-181688 PC **A06**/MF **A01**
T. S. Associates, Inc., Columbia, MD.
Feasibility of Utilization of Waterborne Platforms for the Processing for Ultimate Disposal and/or Reuse of Municipal Sewage Sludge.
Final rept. Oct 79-Mar 80,
T. R. Sundaram, and Abbas M. Sinnarwalla. Mar 80, 111p J8001-P79003-1, MA-RD-940-80067
Contract MA-79-SAC-00057

A preliminary assessment is made of the technical and economic feasibility of carrying out from waterborne platforms the various available treatment unit operations for the disposal and/or reuse of municipal sewage sludge. The use of waterborne platforms for sludge treatment has several advantages: it frees the limited land areas near wastewater treatment plants for other uses; it affords the possibility for carrying out the processing operation enroute to an ultimate disposal site, and; it holds the potential for minimizing environmental impact.

PB80-181696 PC **A09**/MF **A01**
ESCOR, Inc., Evanston, IL.
The Powerplant and Industrial Fuel Use Act of 1978: Its Impact on Illinois,
George R. Lytwynyshyn, and Sidney M. Marder. Aug 79, 182p IINR-79/30

The purpose of the FUA (Fuel Use Act) is mostly three-fold: (1) To reduce the United States dependence on foreign sources of oil, (2) To conserve natural gas and petroleum resources, and (3) To encourage the use of coal and synthetically derived gas from coal or other alternate fuel sources. This study determines the number of installations, both new and existing, in the state of Illinois which will be affected by the FUA and the probable environmental and economic impacts based on actions due to the FUA. All existing and new powerplants and major fuel-burning installations throughout the state were scrutinized. For each type of unit the potential, as well as the probable number of units which fall under the guidelines of the FUA, was determined. The potential number is considered to be the best estimate of all units, both new and existing, which are technically capable of burning coal.

PB80-181779 PC **A04**/MF **A01**
Texas Dept. of Water Resources, Austin.
Analytical Study of the Ogallala Aquifer in Carson County, Texas: Projections of Saturated Thickness, Volume of Water in Storage, Pumpage Rates, Pumping Lifts, and Well Yields,
Ann E. Bell, and Shelly Morrison. Nov 79, 69p TDWR/R-242

This is one of numerous planned county studies covering the declining ground-water resource of the Ogallala aquifer in the High Plains of Texas. The report contains maps, charts, and tabulations which reflect estimates of the volume of water in storage in the Ogallala aquifer in Carson County and the projected depletion of this water supply by decade periods through the year 2020. The report also contains estimates of pumpage, pumping lifts, and other data related to current and future water use in the county.

PB80-181886 PC **A06**/MF **A01**
La France Industries, SC.
Closed-cycle Textile Dyeing: Full-scale Hyperfiltration Demonstration (Design).
Rept. for Sep 77-Apr 79,
Craig A. Brandon. Mar 80, 103p EPA-600/2-80-055
Grant EPA-S-805182
See also report dated Mar 76, PB-251 188. Prepared in cooperation with CARRE, Inc.

The report describes the first (design) phase of a full-scale demonstration of hyperfiltration for closed-cycle operations of a LaFrance Industries dye house. (The remaining three phases are installation, operation, and maintenance.) The decision to demonstrate the process was based on earlier projects that showed hyperfiltration to be potentially economical for recycle/reuse of energy, water, and chemicals in textile preparation, dyeing, and wet finishing. On-site pilot tests of three hyperfiltration modules led to the selection of the Mott-Brandon ZOPA module. Representative wash waters from LaFrance dyeing operations were characterized as a basis for demonstration equipment design. The dye range is to be converted to counterflow with a water flow rate of 50 gpm at 82C, with 96% of the wash water recovered as permeate for direct recycle. Reuse and/or disposal of the concentrate and dye pad residuals will require further study.

PB80-181910 PC **A04**/MF **A01**
TRW Systems and Energy, Redondo Beach, CA.
Total Particulate Mass Emission Sampling Errors.
Final rept. Nov 76-Apr 77,
E. F. Brooks. Jul 79, 52p EPA-600/7-79-155
Contract EPA-68-02-2165

The report gives a first-cut estimate of sampling errors in the measurement of total particulate mass emissions from stationary sources. IERL-RTP Procedures Manual: Level 1 Environmental Assessment expresses the desire to measure at accuracies within a factor of + or - 2 to 3. Measurement errors are divided into two general categories: sampling errors and analysis errors. The report deals with evaluation of total particulate mass sampling errors, within the framework of a system error analysis. The evaluation leads to a ranking of individual error sources and estimates of total system error. Analysis results show that a Level 1 should have a sampling accuracy of better than a factor of + or - 2, with a confidence of 95%, except at a control device outlet where the accuracy is more likely to be a factor of + or - 3, especially if the control device is an electrostatic precipitator.

PB80-181928 PC **A11**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
The Economic Impact of Vapor Control Regulations on the Bulk Storage Industry.
Final rept.,
Richard J. McCarthy. Jun 79, 243p EPA-450/5-80-001

The U.S. Environmental Protection Agency (EPA) is considering regulations which would control total benzene emissions on a national basis. A significant portion of these benzene emissions is contained in the gasoline vapors released during the normal gasoline transfer operations of petroleum bulk terminals and bulk plants. This report assesses economic impacts of several vapor control strategies which would reduce the benzene emissions of the bulk storage industry. The report seeks to: Identify and characterize the bulk storage industry; Determine the number of facility closures expected to occur because of the proposed vapor control regulations; Estimate the employment levels displaced by these closures; and, Calculate the national cost of installing and operating vapor control systems in the remaining bulk storage population.

PB80-181951 PC **A06**/MF **A01**
Metropolitan Service District, Portland, OR.
Prototype Planning Study, Portland (Oregon). Transportation Systems Management (TSM).
Final rept.,
G. Spanovich. Nov 79, 114p UMTA-IT-09-0068-79-1

Transportation System Management (TSM) is a concept that calls for the planning, programming, and implementation of low-capital, short-range improvements designed to increase the efficiency of existing transportation systems. TSM may also serve the goals of energy conservation, environmental protection, and urban revitalization. This report is one of five special studies of the TSM Planning Prototype Studies Program. The program was designed to demonstrate the capabilities of local agencies to undertake TSM planning in a systematic problem oriented manner. This report documents the project in Portland and is designed to provide a summary of the procedures utilized in Portland to systematically develop a regionwide program for TSM delineated on a small area basis. The TSM process includes a statement of goals and objectives, evaluation of existing conditions, a set of proposed action and justification for inclusion of those actions in the area's Transportation Improvement Program.

PB80-181969 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
The Contribution of Heavy-Duty Vehicles to the New York City Emission Inventory.
Technical rept.,
Lois Platte. Feb 80, 18p EPA-AA-TAEB-80-8

The EPA Administrator signed a regulation setting standards for hydrocarbons (HC) at 1.3 g/BHP-hr and carbon monoxide (CO) at 15.5 g/BHP-hr for 1984 and later model year heavy duty vehicles

(HDV). The reduction in the total emission levels due to the introduction of these standards was estimated on a national level by combining the emission inventories of several regions. These regions represent most of the major metropolitan areas in the U.S. that have violations of the national ambient air quality standards (NAAQS) for ozone and CO. This combined inventory may account for a large proportion of the total U.S. population subjected to the high pollutant levels, but it may not be the appropriate inventory for demonstrating the maximum emission reduction achievable through the introduction of the new standards. The inventory of an area characterized by a high traffic density with a large number of HDV should be examined to approximate the maximum reduction in total emissions that can be attributed to the new HDV standards. In an effort to approximate this maximum reduction, the HC and CO inventories for the New York City (NYC) area are examined in this report.

PB80-181993 PC **A02**/MF **A01**
Industrial Environmental Research Lab., Research Triangle Park, NC.
Collection of Fly Ash with High Electrical Resistivity in a Pilot Plant Electrostatic Precipitator Preceded by the EPA/SoRI Precharger.
Journal article,
L. E. Sparks, G. H. Ramsey, and B. E. Daniel. Jul 79, 5p
Pub. in JAPCA, v29 n7 p745-747 Jul 79.

The paper describes experiments designed to demonstrate the effectiveness of a precharger--part of a novel electrostatic precipitator (ESP)--and to provide information needed to design a required downstream collector. The paper presents the first published data demonstrating the effect of the precharger on particle collection in an ESP. Graded penetration curves indicate that rapping reentrainment may be a problem. The penetration of large particles is higher than expected and is probably due to reentrainment. An optimized downstream collector should minimize the rapping reentrainment problem. The paper concludes that the precharger more than doubles the specific collector area of the ESP. Initial capital cost estimates indicate that the precharger will cost about a third to half the cost of one conventional electrical section. A conventional electrical section might increase the SCA of a small ESP, such as used for high sulfur coal, by as much as 33% and the SCA of a large ESP, such as used for low sulfur coal, by no more than 17%. Thus the cost effectiveness of the precharger appears to be excellent. Pilot and prototype scale field tests are planned to confirm the initial results.

PB80-182033 PC **A06**/MF **A01**
Maine Univ. at Orono. Land and Water Resources Inst.
The Application of Physical and Chemical Parameters to the Design of Raised Bed Soil Absorption Systems,
John R. Smith, and Jerry D. Lowry. Apr 80, 111p
W80-04810, OWRT-A-040-ME(5)
Prepared in cooperation with Los Angeles County Sanitation District, CA.

The physical and chemical relationships involved in waste water treatment by raised bed soil absorption systems were quantified and improved design criteria for the treatment of nitrogen, phosphorus, organic carbon, and bacteria and viruses were developed. Study conditions were tailored to those found in Maine where approximately 50% of households are not linked to municipal sewage systems and as little as 15% of the land can accommodate conventional soil absorption systems. For each of the study pollutants, ammonium-nitrogen, nitrate-nitrogen, phosphorus, organic carbon, and bacteria and viruses, transport and retention in soils was investigated and these results were combined with field results from two systems in Maine to design optimum systems for each pollutant.

PB80-182066 PC **A08**/MF **A01**
Monsanto Research Corp., Dayton, OH.
Preliminary Characterization of Emissions from Wood-fired Residential Combustion Equipment,
D. G. DeAngelis, D. S. Ruffin, and R. B. Reznik. Mar 80, 159p EPA-600/7-80-040
Contract EPA-68-02-1874

This report describes a study conducted to quantify criteria pollutants and characterize other atmospheric emissions from wood-fired residential combustion equipment. Flue gases were sampled from a zero clearance fireplace and two air-tight cast iron stoves (baffled and nonbaffled design). Four wood types were tested, oak-seasoned and green- and pine-seasoned and green. Samples were analyzed for particulates, condensable organics, nitrogen oxides, carbon monoxide, sulfur oxides, organic species, and individual elements.

PB80-182165 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Sea Grant Coll. Program.
Understanding the Oceans. Motivating Today's Youth to Work for Tomorrow.
1980, 26p MITSG-80-1, NOAA-80040706
Proceedings of the Annual Sea Grant Lecture and Symposium (8th) held at MIT on 16 October 1979.

The MIT Sea Grant College Program presents the annual Sea Grant Lecture to provide a forum for discussion of perspectives and opportunities for our current and future uses of the seas. The Lecture also explores and heightens awareness of the roles of engineering, science, and the social sciences in developing marine resources, reflecting the Institute's commitment to environmentally balanced development of the oceans and coasts.

PB80-182363 PC **A08**/MF **A01**
Cambridge Systematics, Inc., MA.
Experience with Indirect Source Controls in the United States: Four Case Studies.
Final rept.,
Greig Harvey, Ann Rappaport, and Elizabeth Deakin. Dec 78, 166p
Contract EPA-68-01-4686

This report presents a review of experience with highway air quality assessments in four case study areas: New York State; Connecticut; Puget Sound (Seattle/Tacoma), Washington; and Oregon. Four case studies document the procedures used by federal, state and local governments: (1) To identify the need for an assessment of the air quality effects of a proposed highway project; (2) To determine the appropriate level of analysis when an assessment is required; (3) To provide for review of the air quality assessment by agencies and the public; (4) To resolve differences over technical and policy issues and arrive at a decision. The studies show a wide range of approaches to highway air quality review, with significant differences in aspects such as: (1) Relationships among indirect source review and other state and federal air quality reviews; (2) Number and size of highway facilities to which indirect source review applies; (3) Threshold levels for applicability of indirect source review to new or modified highways; (4) Pollutants covered.

PB80-182470 PC **A08**/MF **A01**
California State Dept. of Transportation, Sacramento. Office of Structures Design.
Rigid Pipe Proof Testing Under Excess Overfills with Varying Backfill Parameters. Section V (Volume 1) - Data Analysis by the Neutral Point Method (Theory and Computer Code).
Interim rept.,
R. E. Davis, F. M. Semans, D. W. Spannagel, and A. E. Bacher. Oct 78, 154p FHWA/CA/SD-78/07

A neutral point (elastic center) approach is used to develop a coded algorithm for the analysis of a rigid pipe embedded in a deep highway embankment. The code was used to develop plots of wall bending moments and thrusts, stresses in the reinforcing bars and concrete and wall displacements resulting from the applications of soil stresses in the embankment. Quasi-theoretical wall displacements and strains commensurate with these parameters have been compared (in other sections of this project report) with measured displacements and strains. The text includes algorithm derivations, flow charts, sample input and output and listings for the main program and the plotting program.

PB80-182504 PC **A02**/MF **A01**
Executive Office of the President, Washington, DC. The White House Office.
The White House Celebration of the Beginning of the Second Environmental Decade.
Feb 80, 12p

The report is the address on the environment by the President of the United States.

PB80-182595 PC **A07**/MF **A01**
Massachusetts Univ., Amherst. Water Resources Research Center.
Analysis of the Water Rate Structure as a Management Option for Water Conservation,
James W. Male, Cleve E. Willis, Frederick J. Babin, and Charles J. Shillito. Dec 79, 150p PUB-112, W80-05007, OWRT-A-125-MASS(1)
Contract DI-14-34-0001-97023

The objective was to assess the potential for residential water conservation by altering the price structure. This document reports on the general consumer responsiveness to variations in water price structure and on an application to one case study. Consumer responsiveness was assessed by applying an ordinary least squares regression analysis to three different functional forms each containing the water price, median income, number of persons per meter, and population density as independent variables. The analyses yielded a range of price elasticities, with the exponential functional form yielding a median value of -.37. Results of the general analysis were applied to a case study to estimate the degree of consumer responsiveness to three different rate structures. Results showed an estimated reduction of residential demand of approximately 15 percent for a three month water short period.

PB80-182629 PC **A03**/MF **A01**
Environmental Protection Agency, Washington, DC.
Federal Financial Assistance for Pollution Prevention and Control.
1979, 31p
Sponsored in part by Council on Environmental Quality, Washington, DC.

The report provides a description of federal and other financial assistance programs available to industry, communities, and farmers to reduce the effects of environmental regulations. These programs are designed to help those firms that are at a financial disadvantage in making pollution control expenditures.

PB80-183312 PC **A04**/MF **A01**
Southern California Coastal Water Research Project, El Segundo.
60-Meter Control Survey off Southern California.
Final rept. Jan-Dec 77,
Jack Q. Word, and Alan J. Mearns. Jun 79, 67p
TM-229
Grant EPA-R-801152

Between 28 April and 9 August 1977, 70 benthic grab samples and 53 trawl samples were taken at 71 stations between Pt. Conception and the U.S./Mexico border aong the 60-meter isobath. Sediment samples were analyzed for volatile solids, COD, total N, S, 7 trace metals, chlorinated hydrocarbons and for abundance, diversity, biomass and richness of infauna. Trawl catches were analyzed for similar biological attributes. The natural variations at rural control sites were computed and compared to conditions at waste discharge and oil seep sites.

PB80-183445 PC **A14**/MF **A01**
Nottingham (H. D.) and Associates, Inc., McLean, VA.
HUD Utilities Demonstration Series. Volume 15, Part 1. Design Cost and Operating Data for Alternate Energy Systems for the Summit Plaza Complex, Jersey City, NJ.
Final rept.
May 79, 315p NBS/GCR-79/164
Contract NBS-5-35870
See also Volume 15, Part 2, PB80-183452 and Volume 11, PB-264 427. Sponsored in part by Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research.

This report develops basic design and operating data for a comparison of alternative methods of

supplying heating, cooling and electric power to a residential/commercial complex. The community complex studied is the Summit Plaza Development located in Jersey City, New Jersey which has been served since January, 1974, by a Total Energy (TE) plant. The Summit Plaza TE project is a demonstration effort of the U.S. Department of Housing and Urban Development (HUD) currently being administered by the National Bureau of Standards (NBS) for analysis of the performance and overall viability of the Total Energy facility. Included in the scope of this study is the following: (1) Analysis of the installed energy system; (2) Conceptual design of alternate energy systems; (3) Estimates of the capital costs of the existing system and each alternate system; (4) Estimates of the operation and maintenance costs of the existing system and alternate systems; (5) Simulation of the energy systems operating through a typical year to determine energy demands and consumptions. The data in this report are incorporated into the Final Report being prepared by NBS for the HUD Total Energy Demonstration Project. The Final Report will compare the energy, economic, reliability, and environmental viability of each energy system.

PB80-183452 PC **A07**/MF **A01**
Nottingham (H. D.) and Associates, Inc., McLean, VA.
HUD Utilities Demonstration Series. Volume 15, Part 2. Detailed Initial Cost Data for Alternate Energy Systems for the Summit Plaza Complex, Jersey City, NJ.
Final rept.
May 79, 142p NBS/GCR-79/165
Contract NBS-5-35870
See also Volume 15, Part 1, PB80-183445 and PB-183 445. Sponsored in part by Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research.

This report presents detailed estimates of the construction cost of 12 alternative energy systems which could supply heating, cooling and electrical services to the Summit Plaza Complex. Construction costs are developed for each system in the report by a quantity take-off for all major and minor equipment for each energy system including the individual electrical and mechanical components of the energy conversion equipment, site distribution, equipment, building terminal equipment etc. The detailed data in the report is summarized in a related report in which the energy performance and costs for the energy system were developed: Design, Cost and Operating data for Alternative Energy Systems for the Summit Plaza Complex, Jersey City, NJ.

PB80-183585 PC **A02**/MF **A01**
New York State Coll. of Agriculture and Life Sciences, Ithaca.
Oil Spills: A Coastal Resident's Handbook.
John T. Omohundro. Mar 80, 16p IB-164, PSSG-2, NOAA-80042206
See also PB80-184351.

People living on or using the water bodies within and bordering New York State will find this bulletin valuable in case of a spill emergency. Knowledge of what can happen and what can be done in case of a spill emergency may save needless confusion, anxiety, and loss or damage. The first half of this bulletin explains what happens in a spill and what official parties will do. The self-help advise in the second half of this bulletin may reduce loss and damage to property owners or sportsmen on Lake Erie, Lake Ontario, the Saint Lawrence Seaway, Lake Champlain, the Hudson River, the Barge Canal System, New York Harbor, Long Island Sound or the Atlantic Ocean. The bulletin should be kept handy as a reference in time of emergency.

PB80-183791 PC **A02**/MF **A01**
Jacobs Associates, San Francisco, CA.
Cut-and-Cover Tunneling, Executive Summary.
Final rept. Jul 74-Jun 78,
G. E. Wickham, and H. R. Tiedemann. Dec 79, 17p FHWA/RD-79-61
Contract DOT-FH-11-8513
See also Volume 2, PB80-183809.

The purpose of the research study was to develop a method for evaluating alternate cut-and-cover tunneling construction systems. This brief report summarizes the evaluation method, which is given in detail in Volume 2 of the final report.

PB80-183809 PC **A14**/MF **A01**
Jacobs Associates, San Francisco, CA.
Cut-and-Cover Tunneling. Volume 2. Cost Analyses and Systems Evaluation.
Final rept. Jul 74-Jun 78,
G. E. Wickham, and H. R. Tiedemann. Dec 79, 307p JA-165, FHWA/RD-76-29
Contract DOT-FH-11-8513
See also PB80-183791, and Volume 3, PB80-183817.

This volume summarizes the findings of the entire study. It presents a method for comparing the costs of alternate construction schemes for cut-and-cover tunneling in urban areas. It considers both the cost of construction and the cost of urban disruption, enabling the planner to choose that construction most effective for his particular requirement.

PB80-183817 PC **A11**/MF **A01**
Jacobs Associates, San Francisco, CA.
Cut-and-Cover Tunneling. Volume 3. Summary Cost Analyses.
Final rept. Jul 74-Jun 78,
G. E. Wickham, and H. R. Tiedemann. Dec 79, 245p JA-166, FHWA/RD-76-30
Contract DOT-FH-11-8513
See also Volume 1, PB-257 014 and Volume 2, PB80-183809.

This volume contains summary cost analyses for 15 of the 176 study situations. The analyses give the unit costs of all labor, equipment, and material resources required to complete each project and are typical of the 176 cost estimates prepared for this study.

PB80-185093 PC **A13**/MF **A01**
Stanford Univ., CA. Inst. for Communication Research.
The Innovation Process for Dial-A-Ride.
Rept. on Phase 1,
Everett M. Rogers, Kathleen P. Magill, and Ronald E. Rice. Jun 79, 295p UMTA-CA-06-0115-79-1

The purpose of the investigation is to examine policy-relevant issues regarding the Federal role in the diffusion of urban mass transportation innovations, and to arrive at an understanding of the innovation process in organizations. This report is Phase I of a three-phase research project, and it documents the nature of the innovation process in organizations that adopted Dial-A-Ride. Dial-A-Ride is a form of demand-responsive transportation characterized by the traveler's telephoning for a bus, van, or cab, as he or she needs a ride. During Phase I, a series of ten in-depth case studies were conducted for the purpose of identifying the general stages of the innovation process in organizations dealing with mass transportation, and specifying those factors in that process pertinent to the adoption of Dial-A-Ride by those organizations.

PB80-186513 PC **A04**/MF **A01**
National Conference of State Legislatures, Denver, CO.
Development of a State Hazardous Waste Management System: Planning, Ownership Options, Liability and Management Technologies.
Jonathan H. Steeler, and Greg H. Lazarus. Feb 79, 74p NSF/RA-790430
Grant NSF-ISP78-21214

The report is the first in a series concerning the development of hazardous waste management capabilities. Economic, technical, and legal aspects of the service component of a hazardous waste management system are examined to provide information to legislators and legislative staff in these areas and to identify future needs. The following issues are addressed: planning methodologies; ownership options; requirements for liability and financial responsibility; management technologies; resource conservation and recovery; and treatment and disposal technology. Tables and charts in the appendices provide a summary of resource and energy recovery potential for hazardous wastes in New York State; unit processes for resource recovery; an estimated magnitude of hazardous wastes from selected industries that are potentially recoverable or recyclable; the distribution of hazardous waste recovery operations in the United States; and unit identification for recovery, treatment, disposal and containment processes.

PB80-186620 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Sea Grant Coll. Program.
Directory of MIT Sea Grant College Program Publications 1978-1979. Volume II.
1980, 33p MITSG-80-3, NOAA-80040708

Since 1968, when MIT became part of the national network of Sea Grant universities, the Program has issued a variety of technical, advisory, and educational publications related to marine-related research conducted at the Institute, and to use of ocean resources. These publications represent the range of Sea Grant-sponsored research. This volume complements MITSG 78-6, a directory listing all MIT Sea Grant Program publications from 1970-1977.

PB80-186810 PC **A99**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Outer Continental Shelf Environmental Assessment Program.
Environmental Assessment of the Alaskan Continental Shelf. Annual Reports of Principal Investigators for the Year Ending March 1979. Volume I. Receptors -- Mammals -- Birds.
Oct 79, 774p NOAA-80042101
See also report dated Oct 78, PB80-130008 and Volume 2, PB80-186828. Sponsored in part by Bureau of Land Management, Washington, DC.

Volume one of a ten-volume set of annual reports of principal investigators for the year ending March 1979 on the environmental assessment of the Alaskan continental shelf deals with receptors, mammals and birds.

PB80-186836 PC **A99**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Outer Continental Shelf Environmental Assessment Program.
Environmental Assessment of the Alaskan Continental Shelf. Annual Reports of Principal Investigators for the Year Ending March 1979. Volume III. Receptors -- Fish, Littoral, Benthos.
Oct 79, 643p NOAA-80042103
See also Volume 4, PB80-186844. Sponsored in part by Bureau of Land Management, Washington, DC.

Volume three of a ten-volume set of annual reports of principal investigators for the year ending March 1979 on the environmental assessment of the Alaskan continental shelf deals with receptors--fish, littoral, benthos.

PB80-186844 PC **A99**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO.
Environmental Assessment of the Alaskan Continental Shelf. Annual Reports of the Year Ending March 1979. Volume IV. Receptors -- Fish, Littoral, Benthos.
Oct 79, 669p
See also Volume 5, PB80-186851. Sponsored in part by Bureau of Land Management, Washington, DC.

Field studies were initiated in intertidal and shallow subtidal habitats in Lower Cook Inlet to examine species composition, zonation and seasonal patterns, trophic structure, rates of production and energy pathways. Habitats examined included rocky intertidal and subtidal areas, sand beaches and mud flats.

PB80-186851 PC **A99**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Outer Continental Shelf Environmental Assessment Program.
Environmental Assessment of the Alaskan Continental Shelf. Annual Reports of Principal Investigators for the Year Ending March 1979. Volume V. Receptors -- Microbiology, Contaminant Baselines.
Oct 79, 703p NOAA-80042105
See also Volume 6, PB80-186869. Sponsored in part by Bureau of Land Management, Washington, DC.

Volume five of a ten-volume set of annual reports of principal investigators for the year ending March 1979 on the environmental assessment of the Alaskan continental shelf deals with receptors--microbiology and contaminant baselines.

PB80-186877 PC **A24**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Outer Continental Shelf Environmental Assessment Program.
Environmental Assessment of the Alaskan Continental Shelf. Annual Reports of Principal Investigators for the Year Ending March 1979. Volume VII. Transport.
Oct 79, 569p NOAA-80042107
See also Volume 8, PB80-186885. Sponsored in part by Bureau of Land Management, Washington, DC.

Volume seven of a ten-volume set of annual reports of principal investigators for the year ending March 1979 on the environmental assessment of the Alaskan continental shelf deals with transport.

PB80-186885 PC **A25**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Outer Continental Shelf Environmental Assessment Program.
Environmental Assessment of the Alaskan Continental Shelf. Annual Reports of Principal Investigators for the Year Ending March 1979. Volume VIII. Transport.
Oct 79, 592p NOAA-80042108
See also Volume 9, PB80-186893. Sponsored in part by Bureau of Land Management, Washington, DC.

Volume eight of a ten-volume set of annual reports of principal investigators for the year ending March 1979 on the environmental assessment of the Alaskan continental shelf deals with transport.

PB80-186893 PC **A99**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Outer Continental Shelf Environmental Assessment Program.
Environmental Assessment of the Alaskan Continental Shelf. Annual Reports of Principal Investigators for the Year Ending March 1979. Volume IX. Hazards.
Oct 79, 686p NOAA-80042109
See also Volume 10, PB80-186901. Sponsored in part by Bureau of Land Management, Washington, DC.

Volume nine of a ten-volume set of annual reports of principal investigators for the year ending March 1979 on the environmental assessment of the Alaskan continental shelf deals with hazards.

PB80-186919 PC **A06**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Outer Continental Shelf Environmental Assessment Program.
Environmental Assessment of the Alaskan Continental Shelf. Executive Summary, April 1978 - March 1979.
Oct 79, 112p NOAA-80042111
Sponsored in part by Bureau of Land Management, Washington, DC.

The Outer Continental Shelf Environmental Assessment Program has focused on nine lease areas on the Alaskan Outer Continental Shelf, extending from the Northeast Gulf of Alaska, around the Aleutian Islands into the Bering Sea and above the Arctic Circle to the Beaufort Sea. Two more areas (Navarin Basin and North Aleutians) were added in FY 79. In each OCS area for which development is proposed, extensive environmental studies must be conducted before such development can proceed with safety.

PB80-187552 PC **A04**/MF **A01**
United States Conference of Mayors, Washington, DC.
Urban Air: A Guide to the Clean Air Act for Local Elected Officials,
Audrey Hoffer, and Tom McClimon. Feb 80, 70p
Grant EPA-T-900882-01
Sponsored in part by Department of Transportation, Washington, DC., Department of Commerce, Washington, DC., and Department of Housing and Urban Development, Washington, DC.

The report explores experiences of cities attempting to resolve conflicts between the requirements of the Clean Air Act Amendments of 1977 (CAA) and those of city programs such as economic growth, transportation and community development. It also seeks to help local officials better understand about the air quality planning process and its relationship to transportation, community development and economic development.

PB80-187636 PC **A06**/MF **A01**
Texas Transportation Inst., College Station.
New Concepts for Traffic Barrier Systems.
Research rept. (Final), Jun 75-Sep 78,
E. L. Marquis, and T. J. Hirsch. Sep 78, 107p RF-3253, FHWA-RD-79-65
Contract DOT-FH-11-8796

The report examines the development of two roadside barrier-median barrier systems by computer simulation. The systems are designated as the Concrete Barrier with Blockedout W Rail and the Thrie T Barrier (TTB). Both systems are designed for impacts by vehicles ranging from 2250 lb (1020 kgm) to 40,000 lb (18,140 kgm). In addition, the concrete barrier with a blockedout W rail was investigated for impacts by vehicles in the 1650 lb (750 kgm) category. Both barriers are sufficiently developed for full-scale testing. The concrete barrier with a blockedout W rail was designed as a rail attached to a vertical wall blocked out with a reusable unit which acts as a one-way spring. The rail was also designed to be attached to a safety shape. The simulation results indicate that the rollover probability of a lightweight narrow wheelbase vehicle impacting a safety shape with a blockedout W rail is significantly reduced when compared to impacts of the same vehicle with a plain safety shape. The TTB was developed by strengthening the European Neher-SWOV barrier. The TTB is a multiple stage barrier utilizing two thrie beam ribbons rigidly separated by a spacer and attached to a post to form a T. Both barriers appear to be capable of redirecting lightweight vehicle impacts at an intensity reduced from existing systems, and both systems appear to be capable of retaining intercity buses.

PB80-189608 PC **A07**/MF **A01**
Transportation Research Board, Washington, DC.
Traffic Control Devices, Geometrics, Visibility, and Route Guidance,
Kenneth R. Agent, Robert C. Deen, Ahmed Essam Radwan, Kumares C. Sinha, and Harold L. Michael. 1979, 129p TRB/TRR-737, ISBN-0-309-02992-9
Library of Congress catalog card no. 80-17543.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

Contents: Warrants for left-turn signal phasing; Guidelines for traffic control at isolated intersections on high-speed rural highways; Use of EC-DC detector for signalization of high-speed intersections; Maintenance costs of traffic signals; Reflectorization of railroad rolling stock; Accident and operational guidelines for continuous two-way left-turn median lanes; Benefit-cost analysis of advance treatment for no-passing zones; Shoulder improvements on two-lane roads; Modern rotaries--a transportation systems management alternative; Highway guide signs--a framework for design and evaluation; Formation and dissipation of traffic queues--some macroscopic considerations; Discomfort glare--a review of some research; Economic models for highway and street illumination designs; Test of 400-W high-pressure sodium vapor lighting; Pavement inset lights for use during fog; Driver performance with right-side convex mirrors; Human factors considerations for in-vehicle route guidance; Feasibility study of route guidance system; Outline of the comprehensive automobile traffic control pilot test system.

PB80-190663 PC **A06**/MF **A01**
Transportation Research Board, Washington, DC.
State Transportation Issues and Actions.
Special rept.,
John S. Hassell, Jr., Jack Kinstlinger, Louis R. Nickinello, Irving Hoch, and John W. Fuller. 1980, 117p TRB/SR-189, ISBN-0-309-02994-5
Library of Congress catalog card no. 80-16029.
Also pub. as ISSN-0360-859X.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

The Second Conference on Statewide Transportation Planning and Programming, conducted by the Transportation Research Board at the request of the U.S. Department of Transportation and its modal administrations, was held April 29 - May 2, 1979, in Warrenton, Virginia. This report contains the proceedings of the conference. Part 1 summarizes the meeting's highlights. Recommendations by participants are noted in Part 2. Part 3 contains the resource papers prepared for conference participants, along with reports of other presentations made during the meeting. Part 4 summarizes the workshop discussions on the various aspects of implementing statewide transportation plans and on the key elements of such plans. Part 5 lists the participants, who represented various local, state, and federal government agencies; associations; consulting firms; and universities.

PB80-810955 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Air Pollution Emission Factors. 1964-May, 80 (Citations from the NTIS Data Base).
Rept. for 1964-May 80,
Diane M. Cavagnaro. Jun 80, 233p
Supersedes NTIS/PS-79/0580 and NTIS/PS-78/0548.

Emission factors for various industry, stationary, and mobile sources are presented in this annotated bibliography of research reports. The calculation and use of these factors are included. (This updated bibliography contains 226 abstracts, 33 of which are new entries to the previous edition.)

PB80-811011 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Food Processing Waste Treatment. 1976-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1976-May 80,
Robena J. Brown. Jun 80, 118p
Supersedes NTIS/PS-79/0578 and NTIS/PS-78/0597. See also 1964-1975, NTIS/PS-78/0596.

The citations cover air pollution, solid wastes, and water pollution control studies for all types of food processing, including canning, rendering, meat packing, fish, vegetable, and dairy products processing. (This updated bibliography contains 111 abstracts, 10 of which are new entries to the previous edition.)

PB80-811029 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Biochemical Oxygen Demand. 1977-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1977-May 80,
Robena J. Brown. Jun 80, 188p
Supersedes NTIS/PS-79/0597 and NTIS/PS-78/0575. See also 1964-1974, NTIS/PS-76/0409 and 1975-1976, NTIS/PS-78/0574.

A broad range of citations dealing with biochemical oxygen demand (BOD) in sewage, industrial waste treatment, and runoff, and limnology are presented. These studies include topics on BOD reduction, models, and biological factors. While many of the reports include a detailed analysis of BOD, some treat the subject only briefly. (This updated bibliography contains 175 abstracts, 39 of which are new entries to the previous edition.)

PB80-811250 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Incineration Studies. 1975-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1975-May 80,
Audrey S. Hundemann. Jun 80, 277p
Supersedes NTIS/PS-79/0543 and NTIS/PS-78/0366. For the companion Published Searches of the Engineering Index Data Base, see NTIS/PS-76/0225, PB80-811268, and PB80-811276. See also 1964-1974, NTIS/PS-76/0223.

Federally-sponsored research on incineration of municipal, industrial, and agricultural wastes is discussed. Topics cover incinerator design, air pollu-

tion control, materials recovery, heat recovery, pyrolysis incineration, and cost studies. (This updated bibliography contains 267 abstracts, 17 of which are new entries to the previous edition.)

PB80-811268 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Incineration Studies. 1975-1978 (Citations from the Engineering Index Data Base).
Rept. for 1975-78,
Audrey S. Hundemann. Jun 80, 327p
For the companion Published Searches of the NTIS Data Base, see NTIS/PS-76/0223 and PB80-811250. See also 1973-1974, NTIS/PS-76/0225.

Worldwide research on the incineration of municipal, industrial, agricultural, and shipboard wastes is discussed. Topics cover incinerator design, air pollution control, materials recovery, heat recovery, pyrolysis incineration, and cost studies. (This updated bibliography contains 317 abstracts, all of which are new entries to the previous edition.)

PB80-811276 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Incineration Studies. 1979-May, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1979-May 80,
Audrey S. Hundemann. Jun 80, 82p
Supersedes NTIS/PS-79/0544 and NTIS/PS-78/0367. For the companion Published Searches of the NTIS Data Base, see NTIS/PS-76/0223 and PB80-811250. See also 1973-1974, NTIS/PS-76/0225.

Worldwide research on the incineration of municipal, industrial, agricultural, and shipboard wastes is discussed. Topics cover incinerator design, air pollution control, materials recovery, heat recovery, pyrolysis incineration, and cost studies. (This updated bibliography contains 73 abstracts, 56 of which are new entries to the previous edition.)

PB80-811300 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Demands and Needs of Future Transportation: Surface Transportation. 1964-February, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Feb 80,
Edith Kenton. Jun 80, 458p
Supersedes NTIS/PS-79/0253 and NTIS/PS-78/0066.

This bibliography is divided into four sections, Urban, Rail, Marine, and General studies. The urban transportation section contains citations which cover such topics as passenger demand forecasting, future system requirements, needs for new types of transportation modes, planning to reduce future demand, and predictions of usage and feasibility of rapid transit railways, buses, taxicabs, and automobiles. The abstracts of rail transportation studies cover freight forecasting, future passenger usage, and revenue predictions. The last two sections, marine and general, cite reports on the future of the U.S. shipping industry and general freight and passenger projections. (This updated bibliography contains 460 abstracts, 30 of which are new entries to the previous edition.)

13C. Construction Equipment Materials, and Supplies

AD-A083 725/2 PC **A10**/MF **A01**
Army Military Personnel Center Alexandria VA
Initial Analysis of the Sulfur-Extended Test Track Constructed at Washington State University.
Final rept.,
Robert Lawrence Garman. 4 Mar 80, 209p

Due to shortages and price increases of asphalt, researchers, oil companies and governmental agencies are exploring the possible utilization of substitute binders and asphalt extenders for pavement construction. These explorations have produced new emerging technologies such as the recycling of asphalt, asphalt rejuvenation, and asphalt extension through the use of wood lignins or sulfur. This report evaluates the sulfur-extended asphalt, and is based upon recently acquired data from the Washington State University (WSU) test track. A brief description of the state-of-the-art of the extension of asphalt with sulfur is presented in Chapter I. A brief description of the Lufkin, Texas and the Boulder City, Nevada field trials is presented in Chapter II to give the reader a better understanding of current field trials. Further details on the construction of the WSU test track are given in Chapter IV.

13E. Couplings, Fittings, Fasteners, and Joints

N80-22710/1 PC **A05**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (Germany, F.R.). Inst. fuer Strukturmechanik.
The Diffusion of Water Vapor in Humid Air into the Bondlines of Adhesively Bonded Metal Joints.
W. Althof. Feb 79, 81p DFVLR-FB-79-06
Text in German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-619).

The moisture content for five aircraft structural adhesives was determined as a function of environment and exposure time. The coefficient of diffusion was calculated and the correlation between the moisture content in the adhesive at saturation and the atmospheric humidity was estimated. Formulas to calculate the time dependent distribution of moisture in adhesive bonds are presented and their predictions are compared with experimental data.

PATENT-4 195 798 Not available NTIS
Department of the Navy Washington DC
Universal Tow Target Adapter.
Patent,
G. Costantino, and D. Carroll. Filed 15 Sep 78, patented 1 Apr 80, 6p AD-D007 204/1, PAT-APPL-943 255
Supersedes PAT-APPL-943 255-78, AD-D005 737.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to a reel launcher having a saddle operationally deployable beneath an aircraft for carrying and towing an aerial tow target. The tow target is connected to the tow cable by an adapter which includes a notch for registration with a latch in the launcher. The adapter includes a nose section and one of a plurality of end fittings specially formed to engage a corresponding connection in different tow targets. The length of the adapter is adjustable by a threaded connection between the nose section and the end fitting which may be locked with the notch in proper alignment by a slot, key and notch arrangement between the two ends. Thus, a single nose section operable with a launcher may be used with different end fittings and tow targets with no other modifications. (Author)

PATENT-4 196 876 Not available NTIS
Department of the Navy Washington DC
Banner Towing Adapter.
Patent,
Richard K. Maughlin, and Ronald D. Moore. Filed 18 Jul 78, patented 8 Apr 80, 7p AD-D007 189/4, PAT-APPL-925 729
Supersedes PAT-APPL-925 729-78, AD-D005 309.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to a banner towing adapter for use in the towing of abanner or target by an aircraft of the type having an arresting tail hook assembly. The towing adapter is installable in the hollow tail hook attachment pin of the aircraft by means of an expanding sleeve. The sleeve is fixed to a first upwardly extending immovable arm which secures the sleeve to the tail hook support structure located on the aircraft. A second arm, rotatably attached to the sleeve and coupled to the tail hook, is provided at its distal end with a hook suitable for securing a towline from the banner to be towed. The towline securing hook is disposable between two hook retainers which act as a constraint when the towline is on the hook. One of the retainers is disposed at the far end of the first arm while the other hook retainer is rotatable about a point fixed on the first arm. The second retainer is lockable in a retaining position by a ball lock pin. When the tail hook moves to the down position away from the aircraft the hook is rotated away from the retainers thus releasing the towline and the attached banner. (Author)

13F. Ground Transportation Equipment

AD-A083 633/8 PC **A04**/MF **A01**
Rand Corp Santa Monica CA
The Use of Microcomputers to Improve Army Ground-Vehicle Readiness.
Interim rept.,
Richard G. Salter. Mar 80, 53p Rept no. RAND/R-2495-ARPA
Contract MDA903-78-C-0121, ARPA Order-3486-3

An assessment of the potential use of on-vehicle microcomputer monitoring of Army ground vehicles. The unique attributes of the microcomputer make possible powerful new techniques for measuring the remaining life of key vehicle components. These techniques include the real-time cumulative measurement of component stress/damage (an innovation called geriometry) and an improvement in trend monitoring through the use of real-time algorithms. Such measures may make it possible to schedule anticipatory maintenance just before the probability of an in-service failure rises to an unacceptable level. This in turn could result in a reduction in the total amount of maintenance and its costs, an improved capability to allocate fixed maintenance readiness, all of which lead to an improvement in combat and tactical vehicle unit readiness. (Author)

AD-A083 683/3 PC **A08**/MF **A01**
Construction Engineering Research Lab (Army) Champaign IL.
Facility Information for: U.S. Army Tactical Vehicle Organizational and Support Maintenance.
Final rept.,
Robert Porter, Roger Brauer, David Dressel, Robert Filecchia, and Sharen Kloster. Apr 80, 158p Rept no. CERL-TR-P-108

This document provides a comprehensive set of planning concepts pertinent to tactical vehicle maintenance construction projects. These concepts are applicable to all generic functions associated with both Organizational and Direct Support maintenance for most Army vehicles. The categories of information contained in this document relate Army policies to the activities, personnel, and equipment required to accomplish a specific function. The information in this document has been integrated into a four-page format, so that all information related to a particular function can be viewed together. Eight types of information are provided: function, policy, issues, assumptions, activities/personnel/equipment, requirements, criteria, and guidance. The document was organized in this manner to permit ready incorporation of applicable information into appropriate Design Guides, Technical Manuals, and standardized design criteria. (Author)

CONF-791171-1 MF **A01**
Argonne National Lab., IL.
Impact of Potential Electric Vehicle Market Penetration on Air Quality.
M. J. Bernard, Ill. 1979, 14p
Contract W-31-109-ENG-38
Specialty conference on transportation and the 1977 Clean Air Act Amendment, San Francisco, CA, USA, 13 Nov 1979.
Microfiche copies only.

Emissions to the air due to electric vehicles will result from several processes during the production, operation, and recycling and disposal of the vehicles. Some of these processes are significantly different than those for conventional vehicles. Mining and manufacturing impacts are different and larger than those for CVs due mainly to battery

production and materials preparation. Battery charging will cause the greatest air pollution during the life cycle of the vehicle. Increases in SOx emissions from electric utilities in regions where coal is the major source of electricity could be significant. The CO, HC, and NOx emissions that would be produced at ground level for CVs are eliminated with EV use, however. Other battery charging emissions take place at the battery. Toxic and potentially explosive gases are emitted during charging of current technology batteries. Particulate reentrainment by urban vehicles will not be discussed for EVs, as this phenomenon is not yet well understood in general, and because EVs are likely to be no different than CVs in this regard, but particulate emissions from tire wear are included. Emissions from recycling of the electrical component materials are likely to be recycled. Little is known about localized emissions due to vehicle accidents with battery rupture and fires. (ERA citation 05:017829)

CONF-800128-2 PC **A02**/MF **A01**
Argonne National Lab., IL.
Environmental Concerns of the Light-Duty-Diesel Engine: Do We Know Enough.
L. R. Johnson, and M. J. III, Moses, D. O. Bernard. 1980, 20p
Contract W-31-109-ENG-38
59. annual meeting of the Transportation Research Board, Washington, DC, USA, Jan 1980.

The diesel engine represents one of the near-term technology options available for fuel conservation in the nation's light-duty vehicles. If light-duty-diesel (LDD) sales continue to grow at their current pace, then diesel vehicles could represent a significant portion of the light-duty-vehicle fleet by 1985. While their benefit is seen as petroleum conservation, major public-health and air-quality concerns need to be resolved before LDD use becomes widespread. Unfortunately, the time to perform the required research is long, and major commitments to the LDD are being made. This paper identified the environmental concerns of LDD commercialization as well as the environmental research that is needed. The major risks appear to be the potential of chronic lung disease and cancer due to compounds associated with the carbonaceous particulate emitted in the diesel exhaust. The extremely small size of the LDD emitted particulates enables the particulates to easily penetrate into the deep lung cavities with yet-to-be-assessed human health effects. Risk statements are developed as the basis for identifying the research required for concern resolution. Specifically, research needs for identified that will determine the health effects, including dose/response impacts and tht will make possible a comparative evaluation of similar concerns that relate to gasoline engines. (ERA citation 05:016104)

N80-22702/8 PC **A08**/MF **A01**
Kumm (Emerson L.), Tempe, AZ.
Design Study of Flat Belt CVT for Electric Vehicles.
E. L. Kumm. Mar 80, 159p NASA-CR-159822, P-1006
Contracts DEN3-114, EC-77-A-31-1044

A continuously variable transmission (CVT) was studied, using a novel flat belt pulley arrangement which couples the high speed output shaft of an energy storage flywheel to the drive train of an electric vehicle. A specific CVT arrangement was recommended and its components were selected and sized, based on the design requirements of a 1700 KG vehicle. A design layout was prepared and engineering calculations made of component efficiencies and operating life. The transmission efficiency was calculated to be significantly over 90% with the expected vehicle operation. A design consistent with automotive practice for low future production costs was considered, together with maintainability. The technology advancements required to develop the flat belt CVT were identified and an estimate was made of how the size of the flat belt CVT scales to larger and smaller design output torques. The suitability of the flat belt CVT for alternate application to an electric vehicle powered by an electric motor without flywheel and to a hybrid electric vehicle powered by an electric motor with an internal combustion engine was studied.

N80-23214/3 PC **A04**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Traction Studies of Northeast Corridor Rail Passenger Service: Executive Summary.
T. W. Macie, and J. A. Stalikamp. 15 Mar 80, 64p NASA-CR-162997, JPL-PUB-80-3
Contract NAS7-100
Sponsored in Part by DOE.

The enabling legislation of 1976 for improvement of service in the Northeast corridor (NEC) requires a schedule of 2 h 40 min between Washington and New York City by 1981 and 3 h 40 min between NYC and Boston, when the electrification is completed. Various options of the NEC operation that may satisfy the legislation were investigated, particularly in terms of travel time and energy consumption. NEC operations were compared with overseas systems and practices. The emerging new technology of AC traction was also evaluated.

N80-23215/0 PC **A04**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Assessment of the Potential of Hybrid Vehicles: Summary.
F. T. Surber. 15 Mar 80, 70p NASA-CR-163059, JPL-PUB-80-13
Contracts NAS7-100, EM-78-I-01-4290

The potential of hybrid vehicles as a replacement of the conventional gasoline or diesel fueled internal combustion engine vehicle within the next 20 to 30 years, was assessed. Hybrid vehicle designs and applications which are technically and economically viable were studied to determine if reductions in petroleum usage were large enough to warrant major expenditures of research and development funds. Critical technical areas where research and development can be most usefully concentrated were indentified.

N80-23216/8 PC **A07**/MF **A01**
Honeywell, Inc., St. Paul, MN. Technology Strategy Center.
Assessment and Preliminary Design of an Energy Buffer for Regenerative Braking in Electric Vehicles.
Final Report.
R. Buchholz, and A. K. Mathur. Dec 79, 138p NASA-CR-159756, DOE/NASA/0048-79/1
Contracts DEN3-48, EC-77-C-31-1044

Energy buffer systems, capable of storing the vehicle energy during braking and reusing this stored energy during acceleration, were examined. Some of these buffer systems when incorporated in an electric vehicle would result in an improvement in the performance and range under stop and go driving conditions. Buffer systems considered included flywheels, hydropneumatic, pneumatic, spring, and regenerative braking. Buffer ranking and rating criteria were established. Buffer systems were rated based on predicted range improvements, consumer acceptance, driveability, safety, reliability and durability, and initial and life cycle costs. A hydropneumatic buffer system was selected.

N80-23217/6 PC **A10**/MF **A01**
MGA Research Corp., Buffalo, NY.
An Analytical Study of Electric Vehicle Handling Dynamics.
Final Report.
J. E. Greene, and D. J. Segal. May 79, 223p NASA-CR-162870, JPL-9950-297
Contract NAS7-100

Hypothetical electric vehicle configurations were studied by applying available analytical methods. Elementary linearized models were used in addition to a highly sophisticated vehicle dynamics computer simulation technique. Physical properties of specific EV's were defined for various battery and powertrain packaging approaches applied to a range of weight distribution and inertial properties which characterize a generic class of EV's. Computer simulations of structured maneuvers were performed for predicting handling qualities in the normal driving range and during various extreme conditions related to accident avoidance. Results indicate that an EV with forward weight bias will possess handling qualities superior to a comparable EV that is rear-heavy or equally balanced. The importance of properly matching tires, suspension systems, and brake system front/rear torque proportioning to a given EV configuration during the design stage is demonstrated.

PB80-176431 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Test Results on a 1975 California Vega Equipped with the Gould Dual-Catalyst Emission Control System.
Technical rept.
May 75, 11p EPA-AA-TAEB-75-25

The Gould Corporation, New Business Division of Cleveland, Ohio requested confirmatory testing of a 1975 California Vega equipped with their catalyst system. The Emission Control Technology Division of the Environmental Protection Agency agreed to test the vehicle on May 6, 1975. The EPA receives information about many devices for which emission reduction or fuel economy improvement claims are made. In some cases, both claims are made for a single device. The EPA is interested in evaluating the validity of the claims for all such devices, because of the obvious benefits to the Nation of identifying devices that live up to their claims. For that reason the EPA invites proponents of such devices to provide to the EPA complete technical data on the device's principle of operation, together with test data on the device made by independent laboratories. In those cases in which review by EPA technical staff suggests that the data submitted holds promise of confirming the claims made for the device, confirmatory tests are scheduled at the EPA Emissions Laboratory. The results of all such confirmatory test projects are set forth in a series of Technology Assessment and Evaluation Reports, of which this report is one.

PB80-176621 PC **A07**/MF **A01**
Electromagnetic Compatibility Analysis Center, Annapolis, MD.
EMC Considerations in Classification Yard Design.
Final rept.,
Daniel J. O'Neill. Jan 80, 137p ECAC-PR-79-035, FRA/ORD-80/12
Prepared in cooperation with IIT Research Inst., Annapolis, MD.

The automated freight classification yard is composed of many electrical and electronic devices working in a complex interrelationship, with the goal of safe and efficient transportation of goods. Since many of these devices potentially emit and/or are susceptible to electromagnetic energy, thus degrading equipment reliability and overall safety, electromagnetic compatibility considerations are of great concern in the design of new yards or the upgrade of presently existing yards. Important railroad electromagnetic compatibility considerations are discussed in a tutorial manner. In addition, measurement techniques used to obtain source and susceptibility data, and techniques to successfully mitigate electromagnetic interference are presented.

PB80-177181 PC **A18**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
Performance Limits of Rail Passenger Vehicles: Evaluation and Optimization.
Final rept. 1 Sep 77-15 Aug 78,
J. K. Hedrick, D. N. Wormley, A. K. Kar, W. Murray, and W. Baum. Dec 79, 401p DOT/RSPA/DPB/50-79/32
Contract DOT-OS-70052

The dynamic performance capability of conventional and radial passenger trucks is identified and optimized with respect to ride quality, stability, and curve negotiation. This report defines, in an engineering sense, the performance boundaries of conventional and radial truck designs to provide guidelines for the evaluation of existing and proposed equipment. Linear dynamic models are developed that are capable of evaluating vertical response of a flexible carbody to random track irregularities, lateral hunting stability, lateral response to random track irregularities, and steady state lateral curve negotiation. The parametric results are presented in the form of charts and histograms which strongly indicate that the dynamic performance is sensitive to primary and secondary suspension parameter selection and that clear performance trade-offs exist including those between ride quality and stroke requirements and lateral stability and curving performance. The radial truck design allows an improved trade-off relationship by

permitting the primary suspension to be designed for curve negotiation while maintaining stability through the radial links.

PB80-177272 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
An Evaluation of the Lamkin Device.
Technical rept.
Jul 74, 6p EPA-AA-TAEB-75-02

Mr. Cliff Lamkin contacted the Environmental Protection Agency's Emission Control Technology Division concerning an invention of his which allegedly reduced exhaust emissions and improved fuel economy. He supplied data from an independent laboratory on tests conducted with and without the device installed on a motor vehicle which indicated a marked reduction in emissions with the device installed. He was invited to the Motor Vehicle Emission Laboratory for confirmatory testing during the week of April 22, 1974. The Lamkin device did not improve emissions or fuel economy as much as reducing the idle CO did. Mr. Lamkin indicated that he had not tried his device on a newer, leaner-running car. Mr. Lamkin's invention was a modification to the stock carburetor using an unconventional fuel metering system.

PB80-177553 PC **A11**/MF **A01**
Shaker Research Corp., Ballston Lake, NY.
A Methodology for Evaluating the Maintenance of High Speed Passenger Train Trucks.
Final rept. Dec 76-Feb 78,
Allan I. Krauter, and Richard L. Smith. Dec 78, 231p DOT-TSC-FRA-78-7, FRA/ORD-78/73
Contract DOT-TSC-1308

This report describes the application of a methodology, the simulation cost model (SCM), to the economic aspects of maintaining high speed passenger train trucks. The methodology provides a description of truck maintenance, gives the annual costs for this maintenance, and allows sensitivity analyses and time projections to be made. The report first reviews and classifies present and near-term trucks for consideration by the methodology. The SCM methodology is then presented and described. It is applied to two trucks -- the truck of the Metroliner (powered) and that of the Amcoaches (unpowered). These applications are used to indicate data requirements, to present the type of results obtainable from the technique, and to show how the results can be used. The relationship between the SCM and truck specifications is explored.

PB80-177637 PC **A05**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
Response Analyses of a Boxcar with Compliant Lading for Several Track Profile and Hunting Conditions.
Technical rept.,
George Kachadourian, and Nathan E. Sussman. Apr 80, 90p MTR-79W00317, FRA/ORD-80/4
Contract DOT-FR-54090

The simulation in the FRATE computer program (Freight Car Response Analysis and Test Evaluation) was modified from a flexible TOFC (trailer on flatcar) to a rigid boxcar with compliant lading. Analyses were performed to obtain the response of boxcar elements and compliant lading to several track profile and body hunting conditions. Three types of track profile irregularities were simulated: (1) a single vertical irregularity on both rails, (2) a single vertical irregularity on one rail and (3) rectified sine representations of staggered joint bolted rail. Hunting conditions were simulated by imposing sinusoidal lateral motions at the wheel rail interface. Worst case conditions resulted in wheel-rail separations and in potentially damaging accelerations of the lading.

PB80-177926 PC **A12**/MF **A01**
Lea (N. D.) and Associates, Inc., Washington, DC.
Assessment of the Phase I Morgantown People Mover System.
Final technical rept.,
C. Elms, H. Meritt, T. McGean, F. Cooke, and W. Bamberg. Dec 79, 273p UMTA-IT-06-0157-79-1
Contract DOT-UT-70023
Prepared in cooperation with SNV Studiengesellschaft Nahverkehr mbH, Hamburg (Germany, F.R.).

This assessment describes the installation and operation of Phase I of the Morgantown People Mover System at West Virginia University in Morgantown, West Virginia. A detailed description of the technical subsystems is included as well as a review of performance, reliability, maintainability, and cost. A system implementation history is also provided. Where important, the review of technical subsystems includes applicability, modifications, and/or improvements for application in an urban environment. Information and data presented were collected through surveys of the literature, site visits, a visit to the manufacturer, interviews with site and manufacturer's personnel, site measurements, reviews of operating and maintenance logs, and compilations generated by the manufacturer, the operator, and the U.S. Department of Transportation. A draft of this report has been reviewed by the operator, the manufacturer, and UMTA. Their comments have been incorporated where it has been possible to do so without compromising the objectivity of the assessment.

PB80-178171 PC **A04**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
TOFC (Trailer on Flatcar) Lading Response Analyses for Several Track Profile and Hunting Conditions.
Technical rept.,
George Kachadourian. Apr 80, 73p MTR-79W00318, FRA/ORD-80/3
Contract DOT-FR-54090

The computer program FRATE is a non-linear, time domain digital computer program developed under Federal Railroad Administration sponsorship for the purpose of studying freight car response dynamics. The trailer on flatcar (TOFC) simulation contained in FRATE was expanded, for the purposes of the analyses of this report, to include a compliant lading representation. The compliant lading consisted of two spring mounted masses in each trailer with vertical, lateral and roll degrees of freedom. Analyses were performed to obtain the response of the TOFC vehicle and compliant lading to several track profiles and body hunting conditions. The analysis results characterize the response of a standard TOFC configuration to typical service conditions. Undesirable response conditions are noted and recommendations are made for improvements.

PB80-178981 PC **A05**/MF **A01**
IIT Research Inst., Chicago, IL.
Implementation Analysis of Brake Inspectability Requirements.
Final rept.,
A. L. Cross, W. Wakeley, O. J. Viergutz, and M. Harvey. Dec 79, 80p DOT-HS-805 297
Contract DOT-HS-9-02112

An accurate description of the feasibility, optimum schedule, and cost of implementing a brake inspectability requirement for all production passenger cars (PPC) and light trucks (LT) was prepared. The work was performed as a part of Task 1h Manufacturing and Maintainability, which addresses the need for supporting fuel conservation through vehicle design. The study made use of best available data on PPC and LT current and projected production designs and data, real and predicted costs of production, and expert engineering judgement, to predict the impact of separate inspection requirements and the overall consequences of implementation for improvement of fuel economy.

PB80-178999 PC **A03**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Engineering Operation Div.
EPA-Volkswagen Light Duty Diesel Correlation Study, 1979.
Correlation rept.,
Carl Scarbro. 1980, 31p EPA-AA-EOD-80-1

In response to a meeting with representatives of Volkswagen on September 14, 1979, a correlation study was organized to characterize some of the factors causing hydrocarbon offsets during the 1980 diesel certification program. (Volkswagen read 40% lower hydrocarbon emissions than EPA). The hypothesis presented at this time by Volkswagen were: (1) offsets do not occur because of sample line variations from lab to lab and (2) offsets are caused by diesel fuel composition differences between EPA's fuel and Volkswagen-Wolfsburg's fuel. These two hypotheses were tested in two separate experiments at EPA as part of the correlation study. In November, Volkswagen brought two vehicles to the United States and requested EPA to do a series of six Hot LA-4s on each vehicle at the EPA facility. This report is the summary of the three different studies performed in cooperation with EPA plus the results of independent Volkswagen cooling fan experiments. These studies included similar vehicles and facilities, but addressed different correlation cause/effect relationships.

PB80-179039 PC **A04**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
AMTV Headway Sensor and Safety Design.
Final rept. Dec 78-Jan 80,
A. R. Johnston, M. Nelson, P. Cassell, and J. T. Herridge. Jan 80, 72p TSR-79-120, UMTA-CA-06-0058-80-1
Contract DOT-AT-60008T

Progress on two related aspects of the development of an Automated Mixed Traffic Vehicle (AMTV) is described. The two tasks involve improvements to the headway sensing system, and development of AMTV body design concepts that will minimize the chance of injury to pedestrians or occupants in the unlikely event of a collision. The problem of sensing in turns is explored experimentally and requirements for future turn sensors are discussed. A recommended headway sensor configuration employing multiple source elements in the focal plane of one lens, operating together with a similar detector unit is described. Sensor technology is also explored more generally. Alternative concepts including laser radar, ultrasonic sensing, imaging techniques and radar, are compared to the present proximity sensor approach. This report contains guidelines for front-end body designs. Body design concepts are suggested, and sketches presented. This report also contains numerous charts illustrating AMTV sensor design, turn and U-turn sensor design, ultrasonic sensor design, as well as a list of references.

PB80-179146 PC **A05**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Standards Development and Support Branch.
Recommended Practice for Determining Exhaust Emissions from Heavy-Duty Vehicles Under Transient Conditions.
Technical rept.,
Chester J. France, William Clemmens, and Tad Wysor. Feb 79, 84p EPA-AA-SDSB-79-08

This recommended practice represents the completion of one phase of EPA's transient cycle development effort. The finalized chassis procedures detailed here parallel the engine test procedures recently published as subpart N of the Heavy-Duty Notice of Proposed Rulemaking (NPRM). The engine test will remain for EPA the primary means of determining transient heavy-duty emissions; however, the chassis test will be available when total-vehicle testing is desired (for example, for a radically new engine design, for in-use programs, or perhaps for future durability testing on in-service vehicles). This report contains a bibliography of EPA technical reports and contract reports which document various aspects of the chassis driving cycle and engine cycles' development.

PB80-179229 PC **A17**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Highway Noise Criteria Study: Traffic Noise Data Base.
Final rept.,
Daniel R. Flynn, Carl R. Voorhees, and Simone L. Yaniv. Apr 80, 385p NBS-TN-1113-1
Sponsored in part by Federal Highway Administration, Washington, DC.

This report documents a traffic noise data base that was obtained as part of a large research program developed to identify and quantify the important physical parameters which affect human response to time-varying traffic noise and to investigate various procedures for rating such noise so as to enable reliable predictions of subjective response to the noise. Fifteen-minute recordings of actual traffic noise were made at four microphone positions (7.5, 15, 30, and 60 m from the centerline of the near lane) at several times of the day at

each of seven sites, five representing nominally constant-speed traffic and two representing stop-and-go intersection traffic. The 107 recordings that resulted were subjected to extensive analysis. The analysis procedures are described and tables and graphs are included which document, for each recording, the 1/3-octave band spectra and numerous noise descriptors computed from the time-histories of the A-weighted sound level. As a separate part of this study, recordings also were made of the noise from single-vehicle passbys and from simulated traffic consisting of controlled drive-bys of up to ten vehicles. These recordings also were extensively analyzed and the results of these analyses are given.

PB80-180474 PC **A07**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Inspection and Maintenance Staff.
Motor Vehicle Emission Inspection/Maintenance Information Kit.
Final rept.
Sep 78, 144p EPA-460/3-78-013

Transportation-related air pollution continues to poison the air we breathe. In the nation's urban areas almost all of the carbon monoxide, about half of the hydrocarbons, and somewhat less than half of the nitrogen oxides (the latter two helping to form photochemical oxidants or smog) come from mobile sources. Inspection/maintenance complements the national effort to control motor vehicle emissions. The Clean Air Act Amendments of 1977 set forth specific requirements for the implementation of motor vehicle inspection/maintenance (I/M) programs. This report contains a policy paper indicating what the Environmental Protection Agency will consider a minimally acceptable program wherever I/M is required by the Act. Also included are sections detailing the benefits, costs, legislation, training and implementation of I/M programs.

PB80-180557 PC **A04**/MF **A01**
Washington Univ., St. Louis, MO. School of Engineering and Applied Science.
Theoretical Manual and Users' Guide: Longitudinal-Vertical Train Action Model.
Technical rept.,
Sheng K. Yin. Apr 80, 69p FRA-ORD-76/278
Contract DOT-OS-40106

A mathematical model for simulating the longitudinal-vertical motion of railroad cars in impact situations is described in this document. Development and validation of the model was part of a study concerned with the phenomenon of coupler bypass resulting from impact or squeeze. The model represents each car as an idealized dynamic system, consisting of springs, masses and dampers and possessing up to 6 degrees of freedom (12 state variables) per car. The degrees of freedom correspond to the longitudinal, vertical and pitching motion of car bodies, lading motion, and truck motion (front and rear separately). The model is capable of representing friction draft gears as well as hydraulic cushioning devices. The model accounts for friction between truck side frame and bolster, possible separation of the truck center plate from the truck bolster and coupler disengagement. A limitation of the model is that, in the absence of more accurate information, the force-deflection relationship of car underframes is represented by linear springs. However, it can be readily modified to represent non-linear force-deflection relationships once those relationships are quantified.

PB80-180664 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Investigation into Hydrogen Sulfide Odor Problem on a Privately-Owned, Catalytic Converter-Equipped 1975 Automobile.
Technical rept.
Jun 75, 8p EPA-AA-TAEB-75-26

The Michigan-Ohio District Office of the Environmental Protection Agency was contacted in April, 1975 by a person living in the Cleveland, Ohio area about the unpleasant odor emanating from his brand-new 1975 catalytic converter-equipped Plymouth Gran Fury. The odor had been noticeable from the time the owner took delivery of the car, and was at its worst when the car was idling or moving in dense traffic, according to the owner. Along with the unpleasant odor, irritations of the throat and nose were experienced by the owner and his family. District Office personnel contacted the Emission Control Technology Division for technical advice on the problem. The owner was invited to bring his car to the Motor Vehicle Emission Laboratory (MVEL) for a thorough investigation. This report covers that investigation, which took place in early June, 1975.

PB80-180961 PC **A04**/MF **A01**
National Transportation Safety Board, Washington, DC. Office of Evaluations and Safety Objectives.
Safety Effectiveness Evaluation of the National Highway Traffic Safety Administration's Rulemaking Process. Volume 4. Analysis, Conclusions, and Recommendations.
Safety rept.
15 Apr 80, 63p NTSB-SEE-80-3
See also Volume 3, PB80-158298.

The Safety Board has conducted an evaluation of the motor vehicle safety standard rulemaking process of the National Highway Traffic Safety Administration (NHTSA) of the U.S. Department of Transportation (DOT). This report presents the analysis and conclusions of the Board's investigation and constitutes the fourth and final volume of the evaluation study. The three previously issued reports in this study include case histories of Federal Motor Vehicle Safety Standard (FMVSS) 121, the air brake systems standard, FMVSS 208, the occupant crash protection standard, and current rulemaking of the NHTSA. The case histories do not attempt to evaluate or draw conclusions about standards or the rulemaking process, but develop a factual basis upon which the analysis presented in this report is based. The report is divided into three parts. The first section examines the NHTSA's past rulemaking process by analyzing two significant examples, FMVSS 121 and FMVSS 208. The second section analyzes current rulemaking of the NHTSA. The final section presents the conclusions of this report and specific recommendations.

PB80-181019 PC **A09**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Control Law Implementation for Short Headway Vehicle-Follower Automated Guideway Transit (AGT) Systems.
Final rept.,
A. J. Pue. Oct 79, 181p UMTA-MD-06-0038-79-2
Contract DOT-UT-80009

Automated guideway transit (AGT) systems are a new class of urban transport in which automatically controlled vehicles operate on dedicated guideway networks. This report examines the implementation of a vehicle-follower control law for short headway AGT systems in terms of required sensor accuracy, controller structure, and data transmission requirements. In this report controller configurations are recommended for headways of 0.5 and 3.0 s that require an 8 bit uplink word at intervals of 0.1 and 0.5 s, respectively. Accomplishments, recommendations, and areas for further study are also presented.

PB80-181142 PC **A06**/MF **A01**
Washington Univ., St. Louis, MO. School of Engineering and Applied Science.
Tank Car Head Puncture Mechanisms.
Final rept. 1 Mar 74-30 Jun 76,
D. A. Peters, B. A. Szabo, and W. B. Diboll. Apr 80, 107p FRA-ORD-76/269
Contract DOT-OS-40106

In a number of railroad accidents the shell heads of hazardous material tank cars have been punctured. This report is concerned with the description and analysis of head puncture mechanisms. Three classification yard accidents and one main line accident were studied in detail, train-to-train collision tests were analyzed and the results of impact experiments were evaluated. The main conclusion of the report is that head puncture in classification yards is invariably due to overspeed impact. Such accidents can be prevented either by providing some fail-safe control for keeping impact speeds below 8 mph or, if impact speeds cannot be kept below 8 mph, not humping or flat switching more than one hazardous material tank car, or cars following it, onto any one track and requiring tank car heads to be designed or retrofitted to absorb a minimum amount of impact energy to be specified on the basis of further experiments and analytical studies recommended in this report.

PB80-181373 PC **A04**/MF **A01**
Transportation Systems Center, Cambridge, MA.
Dynamic Response of Finite Length Maglev Vehicles Subjected to Crosswind Gusts.
Final rept. Jun-Sep 79,
Devendra P. Garg, and Timothy M. Barrows. Mar 80, 63p DOT-TSC-RSPA-80-5

A two-degree-of-freedom model for magnetically levitated finite length vehicles incorporating sway and yaw dynamics is formulated. Aerodynamic lateral forces and yawing moments on the vehicle resulting from constant speed wind gusts are computed using analytical techniques. Computer simulations are run for three vehicle speeds and three apparent mass factors. It is shown that higher apparent mass factors can be instrumental in reducing peak displacements and acceleration levels. The guidance-to-lift ratio is not as much affected by an increase in apparent mass factor as are the displacements and accelerations.

PB80-181795 PC **A03**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
Accelerating Walkway System Times Square-Grand Central Station Analysis.
Final rept.,
Cady C. Chung. Dec 78, 46p MTR-7988, UMTA-VA-06-0041-78-3
Contract DOT-UT-50016

An Accelerating Walkway System (AWS) is a high capacity, continuously available mode of transportation that has the potential of filling the level of service gap between walking or conventional moving walkways and conventional vehicular transit systems. The purpose of this Times Square-Grand Central Station case study is to analyze and determine the economic feasibility of an AWS in an urban application with a high passenger demand. It is not the intention of this study to examine the feasibility of replacing the existing rail shuttle system with an AWS. The two types of AWS analyzed were a one-directional reversible linear and a two-directional loop. The study showed that the systems analyzed are capable of carrying the existing high passenger demand of approximately 6,500 per peak hour and 90,000 per day, and of providing a good level of service. The level of service in terms of total travel time provided by the 732-meter AWS will be similar to that of the existing shuttle system during peak hours and better during off-peak hours. The report points out that a major advantage of the AWS is that it is continuously available and the waiting time is minimized. Total capital and Operating and Maintenance (O&M) costs, total cost per passenger, and total cost per place provided for the potential AWS are summarized in the report.

PB80-181860 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Evaluation of the National Clean Air Coalition (NCAC) Dual Catalyst Pinto.
Technical rept.
May 75, 11p EPA-AA-TAEB-75-24

The National Clean Air Coalition (NCAC), a nonprofit environmental organization, contacted the Environmental Protection Agency about a prototype emission control system they had developed and had operating on a 1974 Ford Pinto. The system was aimed at emission levels of .41 grams per mile hydrocarbons (HC), 3.4 grams per mile carbon monoxide (CO), and .4 grams per mile oxides of nitrogen (NOx). Confirmatory testing at the EPA laboratory was requested, and the Emission Control Technology Division agreed to conduct an evaluation test program as part of its continual technology assessment function. The EPA receives information about many systems which appear to offer potential for emission reduction or fuel economy improvement. In those cases in which review by EPA technical staff suggests that the data available shows promise, attempts are made to schedule tests at the EPA Emissions Laboratory. The results of all such test programs are

set forth in a series of Technology Assessment and Evaluation Reports, of which this report is one.

PB80-182181 PC **A05**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
Sleeve Expansion of Bolt Holes in Railroad Rail. Volume I - Description and Planning.
Final rept. Jul 75-Aug 77,
D. V. Lindh, R. Q. Taylor, and D. M. Rose. Feb 80, 76p DOT-TSC-FRA-80-5-I, FRA/ORD-80/5-I
Contract DOT-TSC-1048-1
See also Volume 2, PB80-182199.
Also available in set of 3 reports PC E09, PB80-182173.

The most predominant failure mode of rails with bolt joints is a web crack initiating at the rail bolt hole. This failure mode is of a classical fatigue nature induced by web stress concentration around the bolt hole. This program was conducted to apply a metal-working process to the rail bolt hole to reduce the effect of such stress concentration and to demonstrate the effectiveness of the technique. Using a process known as cold hole expansion, common to the aircraft industry, where the bolt hole is expanded to the point of plastic deformation, a residual compressive stress of both radial and tangential components is formed around the bolt hole. The compressive stress developed effectively reduces the failure-initiating stress concentration at the bolt hole. The effectiveness of the cold-expansion process as applied to rail was demonstrated by comparison fatigue testing of both cold-expanded (CE) and non-cold-expanded (NCE) specimens. Laboratory tests indicated that life improvement for CE specimens was such that web or head failures would be the predominant failure mode, rather than CE bolt holes. The test results were statistically analyzed, indicating a factor of 10 or greater improvement in rail life due to reduction in bolt-hole failure could be anticipated. Experimental equipment was adapted to apply cold hole expansion to an 8.5 mile test section of track in commercial service. Evaluation of this field test is continuing.

PB80-182199 PC **A02**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
Sleeve Expansion of Bolt Holes in Railroad Rail. Volume II - Process Parameters and Procedures.
Final rept. Jul 75-Aug 77,
D. V. Lindh, and R. Q. Taylor. Feb 80, 25p DOT-TSC-FRA-80-5-II, FRA/ORD-80/5-II
Contract DOT-TSC-1048-2
See also Volume 1, PB80-182181 and Volume 3, PB80-182207.
Also available in set of 3 reports PC E09, PB80-182173.

The bolt-hole cold-expansion process has been applied to railroad rail in laboratory tests and has demonstrated a potential for the reduction of rail-bolt-hole-failure incidence. Limited field tests also have been conducted and are currently under long-term evaluation. Because the process is not common to the rail industry, this procedures manual has been prepared to assist in process implementation. The procedures manual describes the process, and provides instruction and recommendations for field application, and establishes the requirements for bolt-hole and tool-size relationships.

PB80-182207 PC **A06**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
Sleeve Expansion of Bolt Holes in Railroad Rail. Volume III - Field Experiment Results.
Final rept. Jul 75-Jul 79,
D. V. Lindh, R. Q. Taylor, and D. M. Rose. Feb 80, 111p DOT-TSC-FRA-80-5-III, FRA/ORD-80/5-III
Contract DOT-TSC-1048-3
See also Volume 2, PB80-182199.
Also available in set of 3 reports PC E09, PB80-182173.

The bolt-hole cold-expansion process has been demonstrated by laboratory tests to significantly affect the initiation and propagation of fatigue cracks from rail bolt holes such that a reduction of the incidence of rail-bolt-hole failure in cold-expanded rail would be expected. A field-verification experiment was implemented in 1977 and reported in Volume I of this report. This volume contains the results of the field experiment, and examination of the effect of fatigue ratio (R) on the observed laboratory fatigue-life improvement of cold-expanded bolt holes, an investigation of crack growth of rails in a vacuum environment, and a comparison of the fatigue performance of cold-expanded bolt holes with rail flashwelds.

13G. Hydraulic and Pneumatic Equipment

AD-A083 637/9 PC **A07**/MF **A01**
Harry Diamond Labs Adelphi MD
Fluerics 40: LJARS, The Laminar Jet Angular Rate Sensor.
Technical memo.,
Tadeusz M. Drzewiecki, and Francis M. Manion. Dec 79, 127p Rept no. HDL-TM-79-7

This report presents an analysis and experimental data in its support for a laminar jet angular rate sensor (LJARS). An LJARS is a device in which a Coriolis force causes a jet to deflect as a function of applied angular rate. This jet deflection is sensed as a differential pressure or flow. Both the theory and the data show that the differential pressure is a linear function of applied angular rate. The report considers the fluid mechanic and fluid dynamic aspects of the device and discusses in detail such areas as jet pressure recovery, dynamic response, and transport delay. In addition, the report expands considerably on the theory by presenting numerous empirical guidelines for the design and the implementation of these devices. Included is a brief heuristic argument for the determination of the transition-to-turbulence point and methods for effecting suitable temperature and null offset compensation. Environmental temperature and pressure effects are detailed. Finally, typical LJARS characteristics are summarized and presented. The important characteristic parameters are thresholds of less than 0.1 deg/s, offsets of less than 0.5 deg/s, and sensitivities of 0.04 Pa/(deg/s). The LJARS output is easily amplified by laminar proportional amplifiers. Other desirable characteristics of the LJARS are an estimated cost of less than $100, high reliability, and instant-on performance. (Author)

AD-A083 805/2 PC **A04**/MF **A01**
Georgia Inst of Tech Atlanta School of Civil Engineering
Cavitation Damage Mechanisms: Review of Literature.
Final rept. Aug 77-Sep 79,
D. C. Wiggert, C. S. Martin, and H. Medlarz. Feb 80, 58p AFAPL-TR-79-2125
Contract F33615-77-C-2036

This report is a companion volume to 'Cavitation Damage Mechanisms: Experimental Study of Cavitation in a Spool Valve.' The state-of-the-art available in the literature is reviewed relative to occurrence of cavitation, the effects of dissolved and free gas, and so-called secondary aspects of combustion/sono-luminescence and electrical/chemical effects. It should be noted that a paucity of literature exists with regard to cavitation in oil hydraulic systems; consequently much of the material discussed deals with water as the working fluid. Throughout the text clear distinctions are made as to the fluid under discussion. The small number of references which do relate to oils are covered as thoroughly as deemed necessary. The last topic to be presented concerns cavitation in hydraulic actuators. This is a markedly different type of cavitation than is dealt with in the present experimental study; it is included for completeness and due to the fact that it can be a potential problem in control system performance, although most often it creates no permanent mechanical damage to actuator components.

13H. Industrial Processes

AD-A083 730/2 PC **A05**/MF **A01**
Adaptronics Inc McLean VA
Investigation into Adaptive Control of a Slip-Cast, Reaction-Bonded Silicon-Nitride Process via Adaptive Learning Network Modeling.
Final technical rept. 31 Jan-30 Sep 79,
Dixon Cleveland, Peter M. Garafola, Basil A. Decina, and Anthony N. Mucciardi. 30 Nov 79, 97p Rept no. ADI-REF-542
Contract MDA903-79-C-0186, DARPA Order-3799

A program was conducted to model the modulus of rupture (MOR) strength using Adaptive Learning Networks (ALN's) for aircraft engine components produced by a slip-cast, reaction-bonded, silicon-nitride production process. The primary objectives of the work were to identify key process variables and to predict optimum values for those variables as a guide for further experimentation. Nonlinear models have been synthesized that predict MOR with an average error of about 4 ksi over a range from 18.6 to 47.8. The manufacturing and analysis work done to date has demonstrated the feasibility of modeling the slip-cast RBSN process with the Adaptive Learning Network methodology and is viewed as the first iteration in the optimization procedure which is ultimately aimed at finding those manufacturing conditions which will produce the strongest, most consistent material strengths. (Author)

AD-A084 062/9 PC **A07**/MF **A01**
Army Military Personnel Center Alexandria VA
A Generalized Machine Requirements Planning Algorithm for Serial Flow Machining Systems.
Final rept.,
Glenn M. Hayes, Jr. Jul 78, 139p
Master's thesis.

The machine requirements planning problem is one which is applicable throughout the manufacturing industry. The use of automation and computer technology makes the use of machine requirements modelling particularly attractive, and the vast capital investment in machining equipment offers significant opportunity for savings through optimization. The machine requirements problem must be modelled as a mixed integer linear program. However, a dynamic programming solution procedure with linear programming postoptimality techniques at each stage of the machining process utilized to provide an efficient, flexible algorithm. The machine requirements model is capable of optimizing any type of machining system, whether or a discrete or continuous operating mode. Through discretizing the machine parameters problem, by limiting tool changes to between passes of a tool, any continuous mode system is approximated as discrete for optimization purposes and a direct interface with the machine requirements planning model is provided. The dynamic programming solution procedure is compared with a mixed integer procedure. The DP formulation is not only more efficient in both time and core but provides sensitivity information and offers a broad spectrum of further application into more complex aspects of manufacturing systems. A survey of machine parameter and machine requirements literature is included in the thesis. (Author)

CONF-800316-2 MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Thermo-Mechanical Process for Treatment of Welds.
R. K. Malik. Mar 80, 24p
Contract EY-76-C-07-1570
WESTEC 80 conference, Los Angeles, CA, USA, 20 Mar 1980.
Microfiche copies only.

Benefits from thermo-mechanical processing (TMP) of austenitic stainless steel weldments, analogous to hot isostatic pressing (HIP) of castings, most likely result from compressive plastic deformation, enhanced diffusion, and/or increased dislocation density. TMP improves ultrasonic inspectability of austenitic stainless steel welds owing to: conversion of cast dendrites into equiaxed austenitic grains, reduction in size and number of stringers and inclusions, and reduction of delta ferrite content. TMP induces structural homogenization and healing of void-type defects and thus contributes to an increase in elongation, impact strength, and fracture toughness as well as a significant reduction in data scatter for these properties. An optimum temperature for TMP or HIP of welds is one which causes negligible grain growth and an acceptable reduction in yield strength, and permits healing of porosity. (ERA citation 05:016122)

N80-22621/0 PC **A07**/MF **A01**
Siemens A.G., Munich (Germany, F.R.). Unternehmensbereicht Baulemente.

Electron Beam Writing on Semiconductors.
Final Report.
H. Bierhenke, E. Kutzer, P. Adolf, H. Plitzner, and P. Rummel. Aug 79, 134p BMFT-FB-T-79-14
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

The results of a 3 year research project related to the production of integrated circuits are reported. Included are wafer exposure techniques, mask making, resist techniques, studies of alignment procedures, manufacturing of device samples, and radiation damage. The use of a commercially acquired electron beam machine in making microelectronic circuits is described.

PB80-178817 PC **A03**/MF **A01**
L.N.K. Corp., Silver Spring, MD. National Science Foundation, Washington, DC. Engineering and Applied Science.
Recognition of Parts and Their Orientation for Automatic Machining, Handling, and Inspection.
Final rept.,
George C. Stockman. 31 Mar 80, 36p NSF/RA-800051
Grant NSF-DAR79-17088

This report describes a technique whereby a flexible robot with vision can recognize a workpiece in various orientations and under certain background conditions of overlap and clutter. A registration technique developed previously to match aerial imagery to maps was tested for matching parts imagery to the blueprints. Primitive features are automatically extracted from the images and a set of vectors derived which represents real or abstract edges in the image. Each vector can be used to determine a unique rotation and translation mapping the image edge onto a model edge. A cluster formed in the space of all such mappings reveals a mapping that matches many edges of the part onto many edges of the model and thus the aspect of the imaged part is known. This registration technique was tested on images of carburetor covers and hinges. In general the results were satisfactory with all types of imagery tested. In all but one case at least one object in the image was correctly acquired.

PB80-178833 Not available NTIS
National Bureau of Standards, Washington, DC.
Comprehensive Test Patterns with Modular Test Structures: The 2 by N Probe-Pad Array Approach.
Final rept.,
M. G. Buehler. Oct 79, 6p
ARPA Order-2397
Pub. in Solid State Technol. 22, n10 p89-94 Oct 79.

Industrial microelectronic test patterns have a multiplicity of probe-pad arrangements which make standard test structure design difficult. A useful arrangement was found to be the 2 by N probe-pad array where N is an arbitrary positive integer. The use of this arrangement is compared to the peripheral probe-pad array approach and is illustrated by a variety of test structures.

PB80-811201 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Diamond Use in Grinding, Drilling, and Machining Operations. 1964-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Apr 80,
Guy E. Habercom, Jr. Jun 80, 146p
Supersedes NTIS/PS-79/0605 and NTIS/PS-78/0583. For the companion Published Searches of the Engineering Index Data Base, see NTIS/PS-78/0584, PB80-811219 and PB80-811227.

Federally-sponsored research on the design, performance, wear, and maintenance of diamond tools is cited. Material removal processes such as surface finishing, drilling, and precision machining are examined. The abrasiveness of diamond tools is compared with the abrasiveness of other hard materials. Processing of ceramics, laser materials and mirrors, metals, optical materials, and rocks is described. (This updated bibliography contains 139 abstracts, 13 of which are new entries to the previous edition.)

PB80-811219 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Diamond Use in Grinding, Drilling, and Machining Operations. 1976-June, 1979 (Citations from the Engineering Index Data Base).
Rept. for 1976-Jun 79,
Guy E. Habercom, Jr. Jun 80, 254p
For the companion Published Search of the NTIS Data Base, see PB80-811201. See also 1973-1975, NTIS/PS-78/0584.

Worldwide journal articles are cited on diamond wheels, saws, lathes, drill bits, and cutting tools. Their design and performance are discussed. Processes described cover surface finishing, honing, reaming, slicing, precision machining, and drilling. These procedures are carried out on ceramics, metals, optical glass and plastics, laser materials and mirrors, reinforced concrete, and rock. (This updated bibliography contains 247 abstracts, none of which are new entries to the previous edition.)

PB80-811227 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Diamond Use in Grinding, Drilling, and Machining Operations. July, 1979-April, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jul 79-Apr 80,
Guy E. Habercom, Jr. Jun 80, 88p
Supersedes NTIS/PS-79/0606 and NTIS/PS-78/0585. For the companion Published Search of the NTIS Data Base, see PB80-811201. See also 1973-1975, NTIS/PS-78/0584.

Worldwide journal articles are cited on diamond wheels, saws, lathes, drill bits, and cutting tools. Their design and performance are discussed. Processes described cover surface finishing, honing, reaming, slicing, precision machining, and drilling. These procedures are carried out on ceramics, metals, optical glass and plastics, laser materials and mirrors, reinforced concrete, and rock. (This updated bibliography contains 81 abstracts, all of which are new entries to the previous edition.)

13I. Machinery and Tools

AD-A083 958/9 PC **A03**/MF **A01**
Defence Research Establishment Ottawa (Ontario)
The DREO Pilot Paper Machine.
Technical note,
Donald A. MacLeod. Jan 80, 33p Rept no. DREO-TN-80-3
Abstract in French.

The DREO experimental paper machine is a versatile apparatus designed for handling wood, synthetic and glass fibers for the production of detector and aerosol filter papers. It consists of five sections - stock preparation, forming, press, dryer and windup whose components are described in some detail. (Author)

PAT-APPL-6-138 944 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Open Ended Ratchet Type Tubing Cutter.
Patent Application,
A. S. Girala. Filed 9 Apr 80, 19p N80-22703/6, NASA-CASE-MSC-18538-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A self-clamping tube and piping cutting tool requiring limited angular motion is described. It includes a handle attached to a C-shaped housing and has an opening sized to admit a pipe.Rotatably mounted within the housing is a C-shaped tool body carrying a set of clamping and support rolls and an edged cutting roll. These rolls contact a pipe at three circumferential points. Cutter advancing means advance the cutting roll toward the support rollers. The support rolls and cutting roll are rotatable independently of the C-shaped housing. A one way ratchet mechanism disposed between the C-shaped housing and the C-shaped tool body permits operation by movement in one rotational direction about the pipe axis. In another embodiment, the tool body is rotated by a power driven mechanism. In addition, an automatic cutter advancing means can be provided.

13J. Marine Engineering

AD-A083 663/5 PC **A18**/MF **A01**
Boeing Vertol Co Philadelphia PA
Investigation to Study the Aerodynamic Ship Wake Turbulence Generated by a DD963 Destroyer.
Final rept. Apr 78-Aug 79,
Theodore S. Garnett, Jr. Oct 79, 425p D210-11545-1, NADC-77214-30
Contract N62269-78-C-0097

A wind tunnel program was accomplished in the Boeing Vertol Low Speed VSTOL facility to evaluate airwake turbulence behind the hull and superstructure of a 1/80 scale DD 963 destroyer model. Early flow visualization work employing smoke and helium/soap bubble techniques identified (and photographed) areas of major turbulence in the lee of prominent superstructure elements. Grids of hot wire anemometer probes were then used to quantitatively map three component velocity levels at selected locations above, behind, and on either side of the ship; for remote wind speeds of 20, 35 and 45 knots with ship yaw angles varied from 0 deg. to 180 deg., and hull roll angle set at 0 deg. and 15 deg. right and left. Digital listings of mean and standard deviation velocity components were prepared from recorded time history tapes of the actual airwake turbulence. The principal application of these test results is expected to include synthesis of a Strouhal Scaled DD 963 airwake math model for helicopter and VSTOL flight simulation work, and formation of a data base for design of shipboard equipment to interface the vessel with its aircraft. (Author)

AD-A083 760/9 MF **A01**
ARINC Research Corp Annapolis MD
Improvement to the Standardization Life-Cycle-Cost Model for Hull, Mechanical, and Electrical Components and Equipments.
Final rept.,
M. Gardner. Mar 80, 138p Rept no. 1662-04-3-2165
Contract N00024-79-C-2683
See also Rept. no. NAVSEC-6116D3-405-78, Apr 78.
Availability: Microfiche copies only.

The objective of this project was to improve the existing Standardization Life-Cycle-Cost Model and develop categories for the components within the Standard Components List (SCL). The model was improved by enhancing (revising) its sparing equations to make them more utilitarian by eliminating elements that did not provide significant life-cycle-cost differences between standard and similar non-standard components/equipments (C/E).

AD-A083 774/0 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Ocean Engineering
A Random Vibration Model for Cable Strumming Prediction.
Michael Kennedy, and J. Kim Vandiver. 1979, 20p
Contract N00014-75-C-0961

A random vibration predictive model for cable strumming response to ocean currents is presented. The model is justified on the basis of an extensive examination of four different field experiments, conducted for the purpose of studying vortex induced cable vibration. The examination of these data reveals that real world cable strumming is predominantly a random process that cannot be predicted on the basis of extending laboratory observations of essentially deterministic phenomena such as lockin. Representative data are presented to support these conclusions. The proposed predictive model is demonstrated by two examples: the response of a uniform cable in a non-uniform flow and the response of a cable non-uniform in diameter to a uniform flow. The results of the second example are favorably compared to measurements made in a simple field test. (Author)

AD-A083 843/3 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA

Ship Arrangements and Combat System Performance.
Progress rept. Aug 79-Jan 80,
Allen E. Fuhs. Jan 80, 70p Rept no. NPS67-80-001

Arrangements, which involve the geometrical features of warship design, have two aspects. One aspect is the geometrical relationship between components; the other aspect includes the quantitative geometrical variables of length, area, volume, shape, and location. About one-half of the paper is devoted to background information concerning interaction between arrangements and various ship characteristics. Topics discussed include items such as seakeeping, sensor location, topside design, weapon location, habitability, and NBC protection. Several different models can be developed to assess arrangements. One approach is to introduce the quantitative aspect of arrangements (length, volume, etc.) into the overall ship design process. The relationship aspect of arrangements is an input made by the designer. Once the design of a warship has converged and has been optimized, the ship can be subjected to combat simulation. During the combat simulation, the relationship aspect can be assessed. Two optimized warships differing in relationship of components fight the same battle. Based on performance in the combat simulation, one ship will be superior. An approach based on subsystems and the interaction between subsystems has been formulated. The formulation is a useful tool for identification of interactions; however, the subsystem method seems less direct than the two step process of overall ship design and combat simulation.

AD-A083 853/2 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA
A Comparative Study of a Steam Surface Condenser Computer Model to Field Test Data.
Master's thesis,
Vincent J. Lynch. Dec 79, 67p

A comparison between a computer model of a steam surface condenser and data from a machinery test of a DDG-37 class engineering plant is provided. Using ORCON1, a computer code developed by the Oak Ridge National Laboratory, a comparison between a computer model and actual data was made in an attempt to verify the code. The sensitivities of ORCON1 to changes in inputs were explored to determine the effect of inaccuracies in the data. Results show that, especially at lower steaming rates, ORCON1 provides a fair model of the condenser. A change was made to ORCON1 to account for vapor velocity effects in the condenser. This change improved the correlations between the code's output and the data. Other changes to the code are proposed. Continuing attempts to verify ORCON1 and further study in improving the code are recommended. (Author)

AD-A083 907/6 PC **A02**/MF **A01**
Naval Submarine Medical Research Lab Groton CT
A Simple Device for Adding Optical Corrections to Periscopes,
S. M. Luria, and Jo Ann S. Kinney. 3 Mar 80, 11p Rept no. NSMRL-927

A simple method of introducing optical corrections for periscope operators is described which neither compromises the integrity of the periscope nor impairs the ability of the operator to look through the periscope. This method makes it feasible to correct astigmatic operators as well as individuals with high spherical error. (Author)

AD-A083 932/4 PC **A11**/MF **A01**
Rhode Island Univ Kingston Dept of Ocean Engineering
A New Propulsion System for Ships.
Final rept.,
Herman E. Sheets, Tadeusz Kowalski, and Albert P. Davis, Jr. 31 Jan 80, 228p
Contract N00014-76-C-0101

Contents: Executive Summary; Introduction -- Limitation of Existing Propulsion Systems, Trends in Ship Power Requirements, Propeller Configuration, Supercavitating Propellers, Water Jet Propulsion, Integrate Ship and Propeller Into a Single System; The New Propulsion System -- The Hydraulic Axial Flow Transmission, Pump -- Specific Speed and Efficiency, The Inverted Turbine, Integrated Transmission Turbine and Propeller, The Thrust Reaction System, Thrust Reversal, Combined Propulsion Efficiency and Transmission Ratio, The Low Cavitation Pump, Boundary Layer Control on Propeller and Ship, The Total System and Contra-Rotation; The Air Models; The Water Model; Propulsion System Performance; Propulsion Applications and System Improvements; Conclusions -- Proof of Concept, Future Applications and the Total Ship System.

AD-A083 940/7 PC **A06**/MF **A01**
Business and Technological Systems Inc Seabrook MD
Program Development to Study Faired Towlines.
Final rept. 1 May 79-29 Feb 80,
J. B. Eades, Jr., and V. Majer. Feb 80, 103p
BTS-IR-80-102, ONR-CR298-003-2F
Contract N00014-78-C-0410

Various computational algorithms have been developed for use in the design and analysis of integrated faired towlines. In the first phase of this development a computer program (HYDROSAP) was constructed. This system determined the two-dimensional response of a flexible streamlined profile section, to its hydrodynamic loading, under simulated towing conditions. The second phase of the development has provided algorithms which, first, determine the section's mechnical characteristics (areas, torsion and shear centers, inertia coefficients, etc.) and second, examines the dynamic behavior of a faired towline under quasi study towing conditions. Since these cables have varied and discontinuous elastic properties, all of the structural programs are constructed using the finite element technique. This provides a convenient means to accomodate the variety of conditions which are present in a problem situation. The presently developed three-dimensional cable program does not have the full capability intended for this analysis tool. A full elastic response of the system has not been modelled in the existing system. The two-dimensional program, however, is a complete and operating system as is the several supporting algorithms used defining the sectional mechanical properties for an integrated, faired cable system. (Author)

AD-A084 005/8 PC **A12**/MF **A01**
Gould Inc Glen Burnie MD Chesapeake Instrument Div
Deploy/Retrieve Storage System (DRSS). Volume II. Part II. Component Definition Appendices.
1980, 275p
Contract N00039-79-C-0329
See also Volume 1, AD-A084 004.

This volume contains the component definition appendices which are the data base for the Final Report of the DRSS study effort. Specifically, each appendix is intended to present a summary of the characterizations, assumptions and analyses required in order to define configuration concepts. This material establishes the basis for support of the conclusions reached in the Final Report. The intent of providing this large body of support data is to (1) assure the establishment of a broad data base at the inception of the DRSS study effort, and (2) to provide the maximum amount of material for review and evaluation in order to expose the design assumptions, and permit assessment of the conclusions reached as a result of this study effort.

AD-A084 006/6 PC **A08**/MF **A01**
Gould Inc Glen Burnie MD Chesapeake Instrument Div
Deploy/Retrieve Storage System (DRSS) Volume II. Part I. Component Level Definition and Tradeoff Analysis.
Final rept. Jun 79-Jan 80.
31 Jan 80, 175p
Contract N00039-79-C-0329
See also Volume 2, Part 2, AD-A085 005. Errata sheets inserted.

This volume has been prepared as part of the DRSS Final Report. This volume documents the analysis and optimization efforts performed at the component level, and provides the basis for analysis and optimization efforts performed at the system level in Vol. I. This volume addresses the four key study areas: Section 1 - Deploy/Retrieve Mechanism, Section 2 - Cable Storage, Section 3 - Cable Guide, Section 4 - Tow/Exit Point. The Antenna Assembly electrical/mechanical performance characteristics and interface requirements are defined where pertinent to the analysis in each section.

AD-A084 031/4 PC **A02**/MF **A01**
Naval Postgraduate School Monterey CA
Recommendations for Ship Hull Surface Representation.
Final rept. Apr-May 79,
Richard Franke. Feb 80, 22p Rept no. NPS-53-80-001

This report gives the results of a study of current and proposed schemes for mathematical representation of ship hulls. It is concluded that a surface definition scheme is necessary and several proposed schemes are reviewed. The use of B-spline surfaces is recommended, along with the use of interactive graphics equipment to define and fair the hull surface. (Author)

PAT-APPL-6-137 026 PC **A02**/MF **A01**
Department of the Navy Washington DC
Coupling for Quick Attachment to Plate-Like Structure.
Patent Application,
Donald L. Enicott, Jr., James M. Walton, and Robert L. Wernli. Filed 3 Apr 80, 21p AD-D007 169/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention provides apparatus for coupling a selected force to a plate-like structure having a hole of selected diameter through it. The apparatus includes a bearing element means for traversing the structure from a first side to a second side of the structure, and flange means comprising a flange for abutting the first side of the structure, and a bushing which is fixably joined to the flange for insertion into the hole. A shaft means is provided which traverses the flange means and which has an end fixably joined to the bearing element means for positioning the bearing element means in a concentric relationship with the bushing, when the apparatus is in a first mode of operation, and for positioning the bearing element means in an eccentric relationship with the bushing, when the apparatus is in a second mode of operation. The apparatus further includes locking means for maintaining the bearing element means and the bushing means in the eccentric relationship when the apparatus is in its second mode of operation, means for providing a force to activate the locking means, and means for coupling the selected force to the shaft means.

PAT-APPL-6-137 681 PC **A03**/MF **A01**
Department of the Navy Washington DC
Submarine Rescue Cable Reel.
Patent Application,
Wayne R. Tausig. Filed 7 Apr 80, 29p AD-D007 167/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Apparatus for delivering a heavy cable such as a rescue cable from the ocean's surface to an extended depth for attachment to an object such as a stranded submarine and, after attachment of the free end of the cable to the object, delivering the cable to the ocean's surface. A syntactic foam float provides positive buoyancy for a frame assembly which supports a cable reel holding the heavy cable. Releasable ballasts are included to provide an initial overall buoyancy of a small negative value during the descent of the apparatus. A release system is provided to simultaneously release the releasable ballast to change the buoyancy of the apparatus to a position value, release the cable reel to allow cable payout. The cable reel is coupled to a waterbrake system which limits the rate of the cable payout to below the rate of ascent of the rescue cable reel. The waterbrake system includes a depth-activated clutch which engages a secondary waterbrake to slow the rate of cable payout near the ocean surface. (Author)

PATENT-4 183 316 Not available NTIS
Department of the Navy Washington DC

Variable Volume Depth Control.
Patent,
George J. Bennett. Filed 5 Dec 77, patented 15 Jan 80, 6p AD-D007 184/5, PAT-APPL-857 720
Supersedes PAT-APPL-857 720-77, AD-D004 830.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An apparatus for controlling the depth of an object submerged in a liquid medium includes a sealed chamber means, joined to the object, which retains a working fluid and which has a variable external volume for displacing variable amounts of the medium. The apparatus further includes a heat transfer device for controlling the external volume of the chamber by heating the working fluid to increase the external volume, and by cooling the working fluid to decrease the external volume. (Author)

PATENT-4 199 006 Not available NTIS
Department of the Navy Washington DC
Pneumatic Valve.
Patent,
Arnold G. Thalhamer. Filed 28 Feb 78, patented 22 Apr 80, 11p AD-D007 210/8, PAT-APPL-882 040
Supersedes PAT-APPL-882 040-78, AD-D005 054.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A pneumatic valve for controlling the inflation of floatation bladders in diver-deployed underwater recovery apparatus comprises, in one embodiment, an inlet connectable to a source of pressurized air, two small semicircular flow passages joining the inlet to an outlet which connects to the bladders, a pair of spring-biased control pistons mounted in parallel in the two flow passages and another spring-biased outlet piston in a larger outlet passage positioned between the flow passages and the outlet. Air flow allowed by either of the control pistons impinges on an end of the outlet piston, displacing it from a normally closed to an open position to permit air flow through the larger outlet passage. (Author)

PB80-178247 PC **A10**/MF **A01**
National Park Service, Denver, CO. Branch of Historic Preservation.
Cultural Resources Inventory: Potential Archeological Resources, Charlestown Navy Yard, Boston National Historical Park,
Audrey R. Marie. Mar 80, 203p FNP-560-80-3

The inventory is based on the documentary sources and includes examples of early nineteenth century industrial and naval technology. Concerned with the historic development of the naval yard after 1800, the study is divided into four parts. Part I details the purpose and applications of the inventory. Part II is a tabulation of potential archeological resources with cross references to Part III which includes maps to support the information presented. Part IV is a set of cards which contain information collected from historical base maps.

PB80-178742 PC **A04**/MF **A01**
General Elctric Co., Arlington, VA. Information Systems Programs.
Shipping Operations Information System; Network Development Project.
Interim rept. Jun 76-Nov 77,
Thomas Choate. Mar 78, 72p MA-RD-930-80028
Contract MA-6-38043
See also PB-290 157.

This report describes the initial activities carried out to achieve the transfer of computerized systems developed in the Shipping Operations Information System (SOIS) to other shipping companies in the U.S.-flag shipping industry. This support effort was needed to heighten the industry's awareness of the benefits of the SOIS program concept and to identify and eliminate technical impediments to the transfer process itself. Principal efforts included the development of simplified documentation, an identification of a carrier interest profile and implementation support for those companies interested in acquiring SOIS modules.

PB80-186414 PC **A02**
Massachusetts Inst. of Tech., Cambridge. Dept. of Ocean Engineering.
Effect of Liquid Storage Tanks on the Dynamic Response of Offshore Platforms,
J. Kim Vandiver, and Shuhei Mitome. 13 Mar 78, 11p MITSG-79-9J, NOAA-80041401
Pub. in Applied Ocean Research, v1 n2 p67-74 1979.

The sloshing of liquids in storage tanks on fixed offshore structures affects both the natural frequencies and damping. Analytic procedures by which one may account for these effects are presented. Also shown is a method for design of tankage that will result in suppression of dynamic response at the fundamental flexural natural frequency of the structure. An important aspect is that no new equipment is required but only optimum configuration of tankage that is already required for storage of water, fuel, mud or crude oil. Supporting data from full scale field studies are presented.

PB80-190028 PC **A06**/MF **A01**
National Maritime Research Center-Kings Point, NY.
Optimization of Ship Routing.
Technical rept.,
E. G. Frankel, and H. Chen. Feb 80, 114p
NMRC-KP-189
See also report dated Jul 78, PB-286 215.

The report summarizes an approach to the problem of minimum ship routing under uncertainty. The problem is essentially treated as a multi-stage stochastic dynamic control process under the constraint of ship operational requirements, probabilistic ocean environmental conditions and ship dynamic response characteristics in seaways. A stochastic dynamic programming algorithm was developed to compute the ship's trajectory and its corresponding power output and heading based on the minimization of the expected total voyage cost.

PB80-810864 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Vessel Traffic Systems. 1964-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-May 80,
William E. Reed. Jun 80, 76p
Supersedes NTIS/PS-79/0610 and NTIS/PS-78/0465.

The bibliography cites Government-sponsored research reports pertinent to vessel traffic systems for harbors, rivers, bays, and sounds. Topics include design, traffic data acquisition and analysis, simulation, surveillance techniques, display systems, radar, communications, and operation. Harbor advisory radar systems are also included. (This updated bibliography contains 70 abstracts, 8 of which are new entries to the previous edition.)

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

PB80-181811 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Fluid Friction Losses in Two Sets of Black Steel Pipe of Recent Manufacture.
Final rept.,
J. R. Whetstone. May 80, 46p NBSIR-80-2041
Sponsored in part by American Iron and Steel Inst., Washington, DC.

Two sets of black steel pipes have been tested at the National Bureau of Standards (NBS) to determine their frictional loss characteristics. Twenty foot lengths of pipe furnished by the American Iron and Steel Institute ranging from one to three inches nominal pipe size were tested using water in the primary flow measurement facilities at NBS. These facilities use static gravimetric techniques with precision timing to determine flow rates to within plus or minus 0.13% based upon three standard deviations. Pipe pressure losses were measured using water and mercury manometers for pipe flow velocities ranging from 4 to 16 feet per second. Frictional loss characteristics of each pipe were characterized using the conventional Hazen-Williams formulation at each flowrate.

SEAC-TR-190 PC **A03**/MF **A01**
Swanson Engineering Associates Corp., McMurray, PA.
Review of Thermal and Structural Analyses for the Fairchild Stratos Division Prototype Lockhopper Valves.
R. S. Joseph. Aug 79, 46p
Contract AP21-79MC11965

This report documents the detailed review of the thermal and structural analyses of the Fairchild Stratos Division (FSD) prototype lockhopper valves. The purpose of this review is to establish whether the FSD prototype lockhopper valve external pressure boundary complies with the Design Criteria for Lockhopper Valve Development Program, and will the valves be safe to operate through the entire METC Prototype Lockhopper Testing and Development Program. (ERA citation 05:014672)

13L. Safety Engineering

AD-A083 790/6 PC **A05**/MF **A01**
Army Military Personnel Center Alexandria VA
A Simple System for Data Acquisition and Photogrammetric Analysis in Traffic Accident Investigations.
Final rept.,
Allan D. Howarth. 29 Feb 80, 79p
Master's thesis.

A simple method for the recording, documentation, and analysis of metric (measurable) traffic accident information using photogrammetric related techniques is presented. Using nonmetric cameras and perspective grid theory, this economical system will meet or exceed the quality of traffic accident diagrams prepared using conventional investigation survey techniques. Integrated procedures for stereoscopic coverage and extension from planimetric to three dimensional mensuration are developed. A literature review is included which describes the European use of stereometric systems applications to traffic accidents and their success with these systems. Reference is also made to courtroom admissibility of the accident diagrams and photography. Also, a pilot project conception is offered. This conception minimizes training burdens, can be initiated in phases and can be evaluated without disrupting current procedures. (Author)

AD-A084 028/0 PC **A06**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Fire and Flammability Characteristics of Materials Used in Rail Passenger Cars. A Literature Survey.
Final rept.,
John A. Rakaczky. Apr 80, 101p ARBRL-MR-03009, SBIE-AD-e430 406

A literature search was conducted to provide information on the flammability characteristics of materials that are used, or have potential use, in furnishing the interiors of rail passenger cars. Among the characteristics of interest were the ignition temperature, time to reach ignition, the rate of flame spread, the rate of combustion or rate of material loss, rate of heat liberation, heat transfer from flames, the evaluation of smoke, the measurement of smoke density, and the evolution and toxicological effect of the products of combustion. In addition, information was collected on flammability test methods, fire prevention standards or codes, and statistical data concerning accidents involving vehicle fires of interior origin. The information compiled is to be used to assist the Federal Railroad Administration, Department of Transportation (FRA/DOT) in establishing safety standards regarding the flammability of the materials used in the interiors of rail passenger cars. 226 References are given.

PAT-APPL-6-135 392 PC **A02**/MF **A01**
Department of the Navy Washington DC
Fill Machine.
Patent Application,
Edward V. Kehiaian. Filed 31 Mar 80, 15p AD-D007 171/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A filling machine for filling an enclosed receptacle with a volatile fluid, and providing increased safety for operating personnel and receptacle storage is presented. An elongated filler tube is insertable into a first aperture in the top of the receptacle. The lower end of the filler tube is provided with second apertures configured for discharge through the apertures and influx into the receptacle of fluid under pressure in a churning manner for generating vapors of the fluid within the unfilled cavity portion of the receptacle. A suction sleeve is disposed above the top of the receptacle about the filler tube and the first aperture for drawing into the suction sleeve air and vapors present above the receptacle top and within the unfilled cavity portion. In this manner, harmful vapors are prevented from reaching operating personnel and oxygen is removed from the cavity portion so that the cavity portion is filled with vapors of the fluid which are substantially purged of oxygen. (Author)

PB80-176399 PC **A05**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Physical Sciences and Engineering.
Survey of Personal Protective Equipment Used in Foundries.
Technical rept.,
Robert D. Mahon, John H. Morrison, Jr., and Lawrence A. Weller. Nov 79, 100p DHEW/PUB/NIOSH-80-100

The National Institute for Occupational Safety and Health (NIOSH) has investigated the nature and extent of use of the personal protective equipment (PPE) in four problem areas (hot environments, silica, metal fumes, and noise) in the foundry industry. The study is intended as a prototype for similar studies in other areas utilizing personal protective equipment. NIOSH was provided a master list of 4,897 foundries (establishments) by the Occupational Safety and Health Administration (OSHA). An adjusted response rate of 57 percent was obtained from a mailed questionnaire. Questionnaire information was validated by site visits to a number of the establishments surveyed, and was found to be reliable.

PB80-178155 Not available NTIS
National Bureau of Standards, Washington, DC.
Testing Symbols for Fire Situations.
Final rept.,
B. C. Pierman, and N. D. Lerner. Mar 80, 2p
Pub. in Fire Command, v47 n3 p12-13 Mar 80.

This article describes the testing and development of pictorial signs for fire situations. The use of symbols for visual communication and issues of standardization are discussed. The National Bureau of Standards has cooperated actively with the National Fire Protection Association in studying two sets of symbols, and the testing programs are described. One set of pictograms included fire safety symbols, for alerting building occupants to aspects of egress, fire alarm, fire fighting, and fire safety. The other set was fire fighting symbols, to aid fire fighters in locating and identifying equipment and utilities. Work on both symbol sets is directed toward eventual standardization by NFPA.

PB80-178940 PC **A10**/MF **A01**
National Public Services Research Inst., Alexandria, VA.
Youth Alcohol Safety Education Criteria Development.
Final rept.,
A. James McKnight, David F. Preusser, Joseph Psotka, Diane B. Katz, and Joan M. Edwards. Oct 79, 209p DOT-HS-805 295
Contract DOT-HS-7-01794

The report describes development and evaluation of knowledge, attitude, and performance measures designed to assess the effectiveness of the Youth Alcohol Safety Education Curriculum. The following measures were developed: Knowledge measure--A multiple choice test of drinking-driving knowledge; Obvious attitude measure--A scale of drinking-driving opinions; Projective attitude measure--A series of drinking and driving scenes to be interpreted; Pseudo-knowledge measure--An opinion scale disguised as a multiple choice knowledge test; and Performance measure--A drinking-driving behavior checklist. The measures were evaluated through administration to high school students prior to and six months following driver education. The knowledge and obvious attitude measures showed sufficient internal consistency to be used on an individual basis. The projective and pseudo-knowledge measures showed sufficient correlation with the obvious measures (.4-.5) to be used as a group measure of attitude. All three attitude measures showed sufficient correlation with subsequent performance (.3-.4) to permit the prediction of group performance.

PB80-178957 PC **A10**/MF **A01**
Michigan Univ., Ann Arbor. Highway Safety Research Inst.
Data Preparation of NHTSA Multidisciplinary Accident Investigation Reports.
Final rept. 1 Jul 77-31 Dec 78,
John A. Green, Marion J. Compton, Wendy H. Barhydt, Corwin D. Morre, and Linda B. Last. Mar 79, 207p UM-HSRI-79-11, DOT-HS-805 293
Contract DOT-HS-5-01134

The report documents procedures for editing, case flow, and work accomplished during the final phase of the contract. The report presents a brief discussion of data preparation and outlines the contents of data sets created from multidisciplinary accident investigation team in-depth reports. The final data sets document over 10,000 case vehicles processed into three data sets containing information on passenger vehicles and light trucks (CPIR), heavy trucks (Version B), and school buses (Version A). In addition, supplementary documentation found in the Occupant Supplement (OS), Damage Analysis Supplement (DAS), Fatal Factors Form (FFF), and air-bag supplement (ACRS) is discussed briefly. Appended to this report is a cross-indexed listing of cases by DOT-HS number for each multidisciplinary team.

PB80-179047 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Flammability Testing of Solids Under the Federal Hazardous Substances Act.
Final rept. 1974-75,
Richard D. Peacock, and Marianne P. Vaishnav. Apr 80, 93p NBSIR-78-1580
Sponsored in part by Consumer Product Safety Commission, Washington, DC.

The objective of the Federal Hazardous Substances Act is to protect the consumer from hazards that arise from a large variety of products. The Act and its regulations have several provisions pertaining to the measurement of the flammability of substances. Some are detailed and explicit; others provide only general guidelines. This report presents the results of a program to provide improvements to particular provisions of the Act and includes test methods that may be used for the testing of various solid materials. An extensive review of the Federal Hazardous Substances Act, its predecessor, and the legislative history provides the basis for some specific recommendations for improvement or clarification. Experimental work performed for the improvement of test methods for shredded or slit films, powders, pastes, and granular substances, and for extremely flammable solids is discussed. This report is based on work sponsored by the Consumer Product Safety Commission and performed from 1974 to 1976.

PB80-181118 PC **A03**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Railroad Accident Report - Head-End Collision of Amtrak Train No. 392 and ICG Train No. 51, Harvey, Illinois, October 12, 1979.
3 Apr 80, 35p NTSB-RAR-80-3

At 9:05 p.m., c.s.t., on October 12, 1979, northbound Amtrak passenger train No. 392 was traveling at 58.5 mph on track No. 4, at Harvey, Illinois. Illinois Central Gulf Freight Train No. 51 was waiting on track No. 3 to crossover to track No. 4 after train No. 392 went north. The switchtender on duty at Harvey aligned the crossover switch on track No. 4 seconds before train No. 392 arrived. Train No. 392 entered the crossover and struck train No. 51. The engineer and head brakeman on board train No. 51 were killed, and all 6 crewmembers and 38 passengers on board train No. 392 were injured. The National Transportation Safety Board determines that the probable cause of the accident was the switchtender's manual misalignment of a switch, immediately in advance of a train, which caused train No. 392 to be directed into a crossover and collide with a standing freight train on the adjacent track. The misalignment was made possible by the lack of an interlock or other positive means to prevent its movement. Contributing to the accident was the lack of training and limiting experience of the employee assigned as switchtender.

PB80-181308 PC **A03**/MF **A01**
Westat, Inc., Rockville, MD. Research Div.
National Accident Sampling System Sample Design. Phases 2 and 3. Executive Summary.
Final rept.,
H. John Edmonds, Robert H. Hanson, David R. Morganstein, and Joseph Waksberg. Nov 79, 26p DOT-HS-805 273
Contract DOT-HS-7-01706
See also Volume 1, PB80-181316.

The report describes the Phase 2 and 3 sample design for the National Accident Sampling System (NASS). It recommends a procedure for the first-stage selection of Primary Sampling Units (PSU's) and the second-stage design for the selection of accidents for investigation. Cost models are developed to estimate the operating characteristics of the NASS. The design features extensive use of stratification and clustering. Controlled probability selection is used to insure geographic dispersion of the 75 recommended investigation sites, including the initial 10 NASS pilot sites.

PB80-181316 PC **A07**/MF **A01**
Westat, Inc., Rockville, MD. Research Div.
National Accident Sampling System Sample Design, Phases 2 and 3. Volume I: Final Technical Report.
Final rept.,
H. John Edmond, Robert H. Hanson, David R. Morganstein, and Joseph Waksberg. Nov 79, 145p DOT-HS-805 274
Contract DOT-HS-7-01706
See also Executive summary, PB80-181308.

The document reports on a redesign of the sample for the National Accident Sampling System (NASS). The NASS is under development by the National Highway Traffic Safety Administration (NHTSA) to provide a representative source of traffic accident data for use by regulatory agencies and accident researchers.

PB80-182108 PC **A05**/MF **A01**
SRI International, Menlo Park, CA.
Application of Decision Analysis to a Regulatory Problem; Fire Safety Standards for Liquid Insulated Transformers.
Daniel Levinthal. Dec 79, 98p NBS-GCR-80-198
Sponsored in part by Department of Energy, Washington, DC.

This analysis is an illustrative application of the methodology of decision analysis to the complex regulatory problem of setting fire safety standards for liquid-insulated transformers. The analysis provides a preliminary structuring of the decision problem. The losses that would ensue under selected alternative safety measures are estimated by the use of a decision tree with probability assignments derived from the expert judgment of transformer manufacturers, developers of insulating fluids, researchers at insurance companies, fire engineers, and available statistical data. Alternative safety measures are evaluated in terms of their cost, the degree of property damage, and level of human losses. Despite the fire community's professed lack of knowledge concerning transformer fires, it was possible to develop a rigorous framework for making this difficult regulatory decision. Although there are significant technological uncertainties, the analysis shows that the critical factor affecting the choice of fire safety standards for liquid-insulated transformers is the level of risk tolerance.

PB80-182710 PC **A03**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Marine Accident Report - Collision of M/V STUD with the Southern Pacific Railroad Bridge over the Atchafalaya River, Berwick Bay, Louisiana, April 1, 1978.
28 Mar 80, 36p NTSB-MAR-80-5

At 1756 c.s.t., on April 1, 1978, the four-barge tow of the Motor Vessel STUD collided with the eastern fixed span of the Southern Pacific Railroad bridge over the Atchafalaya River near Berwick Bay, Louisiana. The collision knocked the span from its supporting piers into the river but did not damage the barges. Damage to the STUD was estimated to be $4,000. Property damage was estimated to be $1,400,000, including the cost of replacing the bridge span and rerouting rail traffic for 8 days. There were no deaths or injuries. The National Transportation Safety Board determines that the probable cause of the accident was the failure of the master to properly align the underpowered tow on the approach north of the Berwick Bay bridges. Contributing to the cause were the inadequate criteria for commencing high water limitations in the Berwick Bay Vessel Traffic Service area, the inadequate horsepower of the STUD in relation to the towlength for maneuvering in the existing river conditions, and the fact that the master of the STUD did not have up-to-date information concerning the river stage and current velocity.

PB80-182983 PC **A02**/MF **A01**
Oklahoma State Univ., Stillwater.
A Review of Human Tolerance to Side Impact.
Final rept. Jul-Sep 1979,
Raymond F. Neathery. Sep 79, 19p DOT-HS-805 296
Contract NHTSA-9-6548

Recent studies on the response and tolerance of human cadavers to side impact are reviewed. Attempts to statistically model these data in order to predict injury from side impact in motor vehicle crashes are detailed. Considering the needs of future crash test standards, deficiencies are cited and additional efforts are recommended.

PB80-183031 PC **A03**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Highway Accident Report - Van/Slow-Moving Farm Vehicle Collision, U. S. Route 6/50, Near Delta, Utah, September 12, 1979.
20 Mar 80, 29p NTSB-HAR-80-2

About 6:25 a.m. and before dawn on September 12, 1979, a 1976 Dodge van, occupied by 14 senior citizens, overtook and collided with a slow-moving farm vehicle near Delta, Utah. The right front corner of the van struck the left rear edge of the 15 1/2-ft-wide cutting attachment that was mounted to the front of the farm vehicle. The van rolled onto its left wheels, traveled off the right side of the road, and struck a concrete bridge parapet that was located 4 1/2 ft beyond the edge of the pavement. Eight van occupants were killed, and six van passengers were injured; the driver of the farm vehicle was not injured. The National Transportation Safety Board determines that the probable cause of this accident was the farm vehicle's inadequate rear lighting system, which failed to identify the slow-moving, overwidth windrower as a hazard to higher-speed traffic approaching from the rear, and the van driver's inability to detect and avoid striking the projecting cutting attachment on the windrower while operating at the posted speed limit.

13M. Structural Engineering

CONF-800412-1 PC **A03**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Proposed Uniform Building Code Seismic Risk Zone Revision in Southeast Idaho.
J. G. Arendts, V. W. Gorman, R. C. Guenzler, and L. G. Miller. 1979, 38p
Contract EY-76-C-07-1570
17. annual symposium on engineering geology and soils engineering, Boise, ID, USA, 2 Apr 1980.

A number of scientific studies concerning geology and seismicity in the Southeast Idaho region have been conducted within the last ten years. The results of these studies, as well as some recent national seismic risk evaluations, indicate that the present Uniform Building Code (UBC) seismic risk zone classification for a major portion of the Southeast Idaho region is excessively high. The objective of the work presented herein is utilization of the scientific evidence to propose a revised UBC seismic risk zone map for Southeastern Idaho where a portion of the present seismic risk Zone 3 is revised to Zone 2. Regional geological information, including known and suspected faults, is presented. A comprehensive summary of magnitude and location of recorded regional earthquake epicenters and their relation to the proposed UBC seismic zone modification is presented. Correlation between the geology of the region and recorded seismic events with the proposed UBC zone revision is shown. A rationale, based on recognized seismic risk studies, is developed for location of the proposed UBC seismic risk zone lines. Correlation with existing national risk zones is shown and inherent conservatisms are discussed. Finally, the detailed location of the proposed revised zone lines is presented. It is noted that the revision affects Southeastern Idaho and small regions of Southwestern Montana and Northwestern Utah. 17 figures, 2 tables. (ERA citation 05:016933)

N80-22753/1 PC **A04**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
The Influence of Bending-Torsional Coupling on the Buckling Load of General Orthotropic, Midplane Symmetric and Elastic Plates.
J. F. M. Wiggenraad. 1977, 75p NLR-TR-77126-U
Contract NIVR-1808

The influence of bending-torsional coupling on the buckling load of general orthotropic, midplane symmetric and elastic plates was studied. This effect was analyzed for the case of infinitely long plate strips, resulting in approximate analytical solutions, which can be presented graphically for the entire range of the elastic constants. These solutions were obtained with the approximate method as applied by Thielemann. The results were compared with results for finite length panels as derived with the finite element method. The conclusion is drawn that buckling loads for plates with aspect ratio over 2 or 3, which demonstrate the bending-torsional coupling effect, can be estimated fairly well from the results for the infinitely long plate strip.

PB80-172406 PC **A11**/MF **A01**
National Research Council, Washington, DC. Committee on Residential Slabs-on-Ground.
Design and Construction of Residential Slabs-on-Ground: State of the Art. Volume I: Proceedings of a Workshop Held on June 20-21, 1978 in Washington, DC.
Jun 78, 226p HUD-0000821
Contract HUD-H-2680

Each of these four reports from workshops on design and construction of residential slabs - on - ground contains papers presented by experts in soil geology, building materials, and engineering design, plus a summary of the discussions which followed the formal presentations. Those presented during the site investigation and risk analysis workshop covered the geotechnical properties and environmental conditions influencing soil behavior beneath residential slabs - on - ground and the problems which must be faced when designing such dwellings. The research and experience workshop focused on soils research and designs which have proved acceptable for various soil conditions. HUD experiences with residential foundations in the San Antonio, Tex., area since 1946 are discussed, and 10 typical designs found acceptable are presented along with approximate costs per square foot. Both reinforced and post - tensioned designs are included. The chemical stabilization discussion describes two effective techniques of lime stabilization and surveys the use of other chemicals. Finally, actual field experience with slab construction is reviewed. Many of the papers contain photographs, engineering drawings, and slab specifications. Tables and flow pressure charts accompany many of the discussions, and others contain statistical data. A list of workshop participants is appended.

PB80-172414 PC **A07**/MF **A01**
National Research Council, Washington, DC. Committee on Residential Slabs-on-Ground.
Design and Construction of Residential Slabs-on-Ground: State of the Art. Volume II: Literature Survey.
Annotated bibliography,
1979, 150p HUD-0000822
Contract HUD-H-2680

The literature survey concerning design and construction of residential slabs - on - ground on which this annotated bibliography is based was conducted by searching three separate data files in two data banks: the National Technical Information Service File No. 6 and the Engineering Index File No. 8 in the Lockheed computer data bank in California and the Highway Research Information Service File No. 8 in the National Academy of Sciences computer data bank. These searches yielded 336 references covering foundation design, soil characteristics, static and dynamic loads, ground settlement, frost and frozen ground characteristics, erosion control and slope stabilization, hydrated lime stabilization, surface water control, and materials characteristics. These articles and research reports include not only works published in the United States, Canada, and Australia, but also those published in Europe. Nearly all of the materials are dated between 1971 and 1978, although a few definitive works from the 1950's are included. A general subject index covers the 15 major categories of the bibliography, and additional cross - referencing is included. Although full publisher information is given for each entry, no data on general item availability are included.

PB80-172505 PC **A10**/MF **A01**
Drexel Univ., Philadelphia, PA. Dept. of Civil Engineering.
Behavior of Precast Concrete Large Panel Buildings Under Simulated Progressive Collapse Conditions. Report 2. Nature and Mechanism of Progressive Collapse in Industrialized Buildings.
John C. Muskivitch, and Harry G. Harris. Jan 79, 212p HUD-0000843
Contract HUD-H-2589

A scale model of a six - story, three - bay cross - wall structure was constructed to study the behavior of a large panel building under simulated progressive collapse conditions. Also, the ability of the tie system to bridge over and contain the damage in a localized area was investigated. The floors were subjected to a series of increasing loads and withstood recommended minimums. To simulate progressive collapse conditions, the interior walls were removed and various pressures applied. The behavior of the model in each of its damaged configurations was strongly influenced by the position of the particular damage, the amount of vertical support provided to the wall assembly, the length of damaged wall, the differences between the design assumptions and actual behavior, the amount of tensile resistance in the tie system compared to the amount required in the design, and the behavior of various model details used for constructing the model and placing the ties. Each test is described in detail, and charts illustrate the loads applied and give test results. The construction of the model is described, photographs illustrate the construction process, and both drawings and photographs illustrate test results. In all cases, ties designed according to the manufacturer's recommendations were adequate. Appendices present additional technical data, a glossary, an explanation of symbols used in the drawings, and references.

PB80-173180 MF **A01**
Portland Cement Association, Skokie, IL.
Special Topics. Report 5. Design and Construction of Large Panel Concrete Structures,
Donald M. Schultz, L. S. Johal, Arnaldo T. Derecho, and M. Iqbal. Jan 79, 172p HUD-0000992, HUD/PDR-107/8
Contract HUD-H-2131R
Paper copy available from the Sup. of Docs., Stock number 023-000-00551-4.

This fifth report in a series, leading to the development of a 'Methodology for the Design and Construction of Large Panel Concrete Structures,' qualitatively and quantitatively discusses topics of analysis technique and design criteria for preliminary seismic response, extreme wind loading, openings in wall panels, connections, and creep, shrinkage, and temperature effects. Multistory buildings constructed with proper inherent structural integrity will not collapse even if one of the load - carrying members of the building does col-

lapse. However, the nontraditional construction technique using large - panel concrete members does not provide new structures with such inherent integrity. Analysis of potential problems, conducted by the Office of Policy Development and Research, indicates that the joints used in large - panel construction have reduced strength and stiffness, and that for severe earthquake conditions the horizontal slip along the joints appears excessive. Minimum design criteria are suggested for new connection details, and load factors are presented for the determination of needed strengthening in buildings subjected to high winds. Analysis techniques are examined for pierced wall assemblies such as linked wall assemblies and peninsular openings. Specific analysis and design techniques are presented to aid engineers in accounting for volumetric changes due to creep, shrinkage, and temperature variations. The effect of these volumetric changes on prestressed floor plank and wall elements is discussed in detail. Appended material includes notations, a summary of the analytical program on connections, and the computer program for dynamic analysis. Tabular data and illustrations cover the basic properties of a 20 - story large - panel wall and the isometric view of idealized large panel structures. References and metric conversion data are presented.

PB80-173305 PC **A06**/MF **A01**
North Carolina State Univ. at Raleigh. School of Forest Resources.
Guide to the Inspection of Existing Homes for Wood-Inhabiting Fungi and Insects,
Michael P. Levy. 1975, 107p HUD-0001083
Sponsored in part by Forest Service, Washington, DC.

This guide teaches homeowners, building inspectors, appraisers, and others interested in reducing home damage caused by wood - inhabiting organisms how to inspect buildings for all types of wood deterioration. After briefly discussing wood as a construction material, the guide describes in detail each major fungus and insect found to inhabit the wood of buildings in the continental U.S. and Hawaii. Each discussion includes a full - color photograph of infested wood, a drawing of a building indicating probable locations of an infestation, a map of the U.S. showing the geographic area where the particular organism may be found, and in some cases drawings of insects. Organisms covered include surface molds and fungi; brown and white rot; various subterranean termites; drywood and dampwood termites; carpenter ants; wood - boring beetles, bees, and wasps; and other wood - inhabiting insects. In addition, the tools and procedures for inspection are discussed. The guide also illustrates key inspection points and provides detailed checklists for inspection of resale houses, with an outline of the corrective procedures for eliminating potential and existing deterioration problems. Finally, reporting the results of the inspection is discussed. Separate checklists are included for buildings with crawl space, basements, and slab foundation construction. Two training manuals and a slide and tape set have been prepared in conjunction with this guide.

PB80-173347 PC **A05**/MF **A01**
Texas Univ. at Arlington. Construction Research Center.
Remedial Measures for Houses Damaged by Expansive Clay. Data Supplement,
Arthur R. Poor. Nov 79, 76p HUD-0001096
Contract HUD-H-2240R

This report documents laboratory and field investigations of various repair techniques duplicated on two geologic formations whose residual soils are predominantly expansive clay. Ten residences in the Dallas - Fort Worth area were selected; five were founded upon the Eagle Ford Shale formation, and five were founded upon the Taylor Marl formation. Identical stabilization techniques were utilized for both foundation soils. Floor slabs had concave and convex curvatures, with corresponding damage conditions reflected in the superstructure. Using materials and equipment commonly available in industry, researchers evaluated the effectiveness of various repair techniques to mitigate volume change in underlying soils with the slab and subsoil acting as a layered entity. Moisture - temperature cells were installed in boreholes at the midpoint of each side of the house slab and calibrated for existing soil properties. Leveling points were inserted around the slab perimeter, with all peg elevations referred to a permanent benchmark. Data acquisition of soil moisture, temperature, and vertical movement was continued over 4 seasonal climatic cycles, or approximately 2 years; data acquisition for 6 homes was continued for about 3 years. Results indicate damage to a home resulting from swelling and shrinking of foundation soils can be minimized by treating the slab and soil as an interacting system. By establishing the water content of the foundation soil at 2 - 3 percent above the plastic limit of the soil and isolating the soil mass or maintaining this moisture content, the volume change due to seasonal weather cycles would be reduced to a minimum. Many graphs and extensive tabular data are included. Supplementary reports are appended. (Author abstract modified).

PB80-173354 PC **A07**/MF **A01**
Texas Univ. at Arlington. Construction Research Center.
Experimental Residential Foundation Designs on Expansive Clay Soils. Data Supplement,
Arthur R. Poor. Dec 79, 135p HUD-0001097
Contract HUD-H-2240R

This report documents activities associated with the design and construction of 11 single - family residences and the behavioral pattern of these structures over 6 seasonal climatic cycles or about 3 years. The floor slabs for all the houses were of reinforced concrete and were placed on the residual highly - expansive clay soils of the Eagle Ford formation located in the Fort Worth - Dallas, Tex., area. The control slab - on - ground for performance comparison was designed in accordance with the Building Research Advisory Board (BRAB) criteria. Eight experimental slabs - on - ground were designed by modifying the BRAB criteria for both reduced and thin sections where the subsurface soil volume change was considered to be inhibited or minimized by various stabilization techniques. One cantilevered, post - tensioned slab - on - ground was designed and constructed on soils in their insitu condition. One locally - used slab - on - ground was both designed and placed by the builder / developer and was monitored for comparative purposes. The subsurface soils beneath each house were instrumented with moisture - temperature cells paired at each elevation and depth in boreholes separated by 1 foot. Borings were located at the midpoint of each side of the house and at the slab center. Permanent leveling inserts were placed in the perimeter beam around each house to determine vertical movements with time. All elevations were referred to a permanent bench mark installed in the project area. Results indicate that preswelling a desiccated soil by raising the natural moisture content by a minimum of 2 to 3 percent above the plastic limit and maintaining the moisture at this level by use of vertical barriers significantly inhibits volume changes in expansive clay soils due to seasonal weather cycles. This was evidenced for both total vertical movements and differential movements. Soil moisture data, soil temperature data, extensive tabular data and numerous graphs are included. The appendix presents supplementary reports. (Author abstract modified).

PB80-178304 PC **A03**/MF **A01**
Texas Tech Univ., Lubbock.
Protection of Property and Occupants in Windstorms. Proceedings of the American Society of Civil Engineers National Convention Held at Dallas Texas on April 29, 1977,
Ernst W. Kiesling, Kishor C. Mehta, and Joseph E. Minor. 29 Apr 77, 37p NSF/RA-770899

The report describes improvements in the design of buildings to increase their resistance to severe winds and thereby provide greater protection to occupants and property. The approach involves protecting people and critical functions in the smallest module and then designing the remainder of the structure to sustain minimum ecnomic loss from severe winds. Although it is impractical to design an entire building to afford a high degree of occupant protection from a tornado, it is practical to design one small room to provide nearly absolute occupant protection. Through attention to design detail it is also possible to reduce significantly the damage to a building affected by severe winds. Residences in particular offer outstanding opportunities to improve structural performance at low cost. Techniques have been developed concerning the kinds and extent of improvements warranted to reduce wind induced damage. The optimum design windspeed is computed for the building. The method depends upon some cost/benefit relationships which are difficult to determine with present damage data.

PB80-178312 PC **A10**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Civil Engineering.
Commonality of Earthquake and Wind Analysis.
Civil engineering studies,
P. J. Cevallos-Candau, and W. J. Hall. Jan 80, 210p STRUCTURAL RESEARCH SER-472, UILU-ENG-80-2002, NSF/RA-800022
Grants NSF-ENV75-08456, NSF-ENV77-07190

The common features of general dynamic analysis procedures employed for evaluating the effects of wind and earthquake excitation were investigated. A major goal was to investigate and develop a basis for generating response spectra for wind loading, which in turn would permit the use of modal analysis techniques for wind analysis in a manner similar to that employed for earthquake engineering. Random vibration techniques were applied for developing response spectra for wind loading. In order to generate wind response spectra, the wind loading is divided into two parts--a mean load treated as a static component and a fluctuating load treated as a dynamic component. The spectral representation of the wind loading constitutes a simple procedure for estimating the forces associated with the dynamic component of the gusting wind. Several illustrative examples are presented demonstrating the commonality.

PB80-178544 PC **A07**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
Seismic Design Decisions for the Commonwealth of Massachusetts State Buiding Code.
Frederick Krimgold. Jun 77, 138p MIT-CE-R77-27, NSF/RA-770895
Grant NSF-GI-27955
Also pub. as Seismic Design Decision Analysis-32.

This report focuses attention on questions of estimating seismic risk in Massachusetts, determining a design earthquake, developing appropriate soil factors, and determining acceptable risk. Aside from documenting the decision process of the Seismic Advisory Committee, this report also attempts to evaluate the role of Seismic Design Decision Analysis (SDDA) methodology and the loss estimates provided by the research project in formulating recommended design criteria. The overall aim of this research is to develop data and procedures for balancing the increased cost of more resistant construction against the risk of losses during future earthquakes. To achieve this objective SDDA has provided a coherent structure for technical inputs from seismology and engineering research to the public policy process for earthquake hazard reduction.

PB80-179294 PC **E07**/MF **$4.50**
Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
Demolition Wastes: Data Collection and Separation Studies.
Final rept.,
David Gordon Wilson, Thomas A. Davidson, and Herbert T. S. Ng. Dec 79, 250p NSF/RA-790407
Grant NSF-AER76-22048

Data on the principal materials contained in demolition wastes have been collected from many cities and towns across the United States. Such information can serve as a basis for establishing policy for demolition and for assisting private industry in planning, particularly with respect to improved treatment. The program comprised the following: (1) extension of previous data collection to include a larger number of cities and small communities; (2) development of a predictive model for demolition-waste generation in any year; (3) collection of the size characteristics of 'raw' demolition debris; and (4) examination of the economic and engineering feasibility of central reclamation plants for demolition wastes. The study indicates that the

quantity of demolition wastes varies widely from year to year but averaged 34 million tons in the mid-seventies. Major components by mass are concrete, wood, and brick, of which only the last is reused in large amounts. Size characteristics of larger demolition pieces were calculated by stereoscopic photography. No combination of indicators is accurate in correlating or predicting the flow of demolition wastes. Economic prospects of a central recycling plant were examined. The report recommends best current practices and needed developments for advanced machinery in demolition and materials reclamation.

PB80-180268 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Energy and Minerals Div.
Slow Progress and Uncertain Energy Savings in Program to Weatherize Low-Income Households.
Report to the Congress.
15 May 80, 62p EMD-80-59

The Department of Energy's Low-Income Weatherization Program could go a long way toward conserving energy and reducing the utility bills of people least able to afford them. However, the program has been hampered by a lack of procedures for selecting homes, considering both energy savings and the need to reach low-income people, problems in obtaining sufficient labor, a lack of emphasis on rental units, legal limits on administrative expenses at the local level, and inadequate financial management and program monitoring at the Federal, State, and local levels. This report contains several recommendations to the Department of Energy for improving its management of the weatherization program.

PB80-180938 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Development of the Flooring Radiant Panel Test as a Standard Test Method.
Final rept.,
C. Howard Adams, and Sanford Davis. Mar 80, 58p NBSIR-79-1954
Sponsored in part by Society of the Plastics Industry, Inc., New York.

This report deals with the standardization phase of the Flooring Radiant Panel Test. It describes work done to develop the test as a standard for measuring one of the major factors contributing to the potential fire hazard of floor covering systems used in corridors and exitways. The investigation invclved major interlaboratory test programs and focused on: (1) establishing realistic test conditions; (2) defining and minimizing variability; (3) drafting a complete and concise test procedure; and (4) demonstrating the soundness of the method. Required flux profile instrumentation calibration procedures were developed and proven. 'Critical Radiant Flux' data obtained on representative floor covering systems showed the rank ordering of important products such as man-made and natural fiber carpets, vinyl asbestos tile, and hardwood flooring. Acceptable repeatabilities of about 20% (within-laboratory variability) and reproducibility of about 35% (between laboratory variability) were demonstrated in two major NBS/MMFPA/CRI interlaboratory carpet system test programs. Fourteen laboratories participated in these full factorial statistically designed experiments with each laboratory testing eighteen carpet materials.

PB80-181738 PC **A04**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
Structural Tests on a One Third Scale Model of a Wood-Joist Floor System,
G. W. Swift. Mar 80, 54p VPI-E-80-11

A methodology has been developed for determining the appropriate stiffnesses of the components of a wood joist floor system and using them in a finite element model of a floor. The method has been applied to relatively few cases. In order to further check its validity it was applied to a one third scale model of a floor system. The results from the application of this method to the scale model are presented in this report.

PB80-182413 PC **A09**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Civil Engineering.
Simple and Complex Models for Nonlinear Seismic Response of Reinforced Concrete Structures.
Civil engineering studies,
Mehdi Saiidi, and Mete A. Sozen. Aug 79, 194p STRUCTURAL RESEARCH SER-465, NSF/RA-790388
Grant NSF-PFR78-16318

This study investigated the possibility of simplifying the nonlinear analysis of reinforced concrete structures subjected to severe earthquakes. One thrust was a microscopic study of the particular elements of the analysis, the hysteresis model, and the development of simple models leading to acceptable results. For this phase, a multi-degree nonlinear model (LARZ) was developed to analyze rectangular reinforced concrete frames for given base acceleration records. LARZ is capable of accepting a collection of hysteresis systems, some previously used and others developed in the course of this project. The new systems generally were simpler. The second phase comprised a macroscopic study which included development of a simple model that resulted in a reasonably close estimate of nonlinear response. A given structure was viewed as a single-degree-of-freedom system which recognized stiffness changes due to the nonlinearity of material. For both phases, the reliability of the analytical models was evaluated by comparing the calculated responses with results of dynamic experiments on a group of small-scale ten-story reinforced concrete frames and frame-walls tested on the University of Illinois Earthquake Simulator.

PB80-182777 PC **A03**/MF **A01**
Sydney Univ. (Australia). Civil Engineering Labs.
Finite Layer Analysis of Consolidation. Part I.
Research rept.,
J. R. Booker, and J. C. Small. Nov 79, 35p R-357

A method for the analysis of the consolidation of a horizontally layered soil under plane conditions is developed. The method depends upon the transformation of the governing equations by a Fourier transform. This transformation has the effect of reducing the partial differential equations of consolidation to ordinary differential equations. The ordinary differential equations are then solved using a finite layer or finite difference approach. Once the solution in the transformed plane has been found the actual solution is synthesized by Fourier inversion. The method leads to a considerable reduction in the amount of core storage necessary for solution and enables the solution of quite significant problems to be obtained on a mini-computer.

PB80-189137 PC **A06**/MF **A01**
Portland Cement Association, Skokie, IL.
Design and Construction of Large-Panel Concrete Structures. Report 6. Design Methodology,
Donald M. Schultz. Mar 79, 118p HUD-0001431
Contract HUD-H-2131R
See also Rept. no. 4, PB-278 757, and PB-248 780.

The report addresses the structural integrity of large-panel concrete buildings under abnormal conditions. It emphasizes the importance of the design strengths of large-panel structures and their individual elements. The layout of the structure and interaction of the individual elements should ensure a robust and stable design. Further, the building should have the ability to support loads caused by normal functions. In addition, there should be a reasonable probability that the building will not collapse catastrophically (progressive collapse) under the effects of misuse or accident (abnormal loadings). The damage that may occur under such conditions should not be disproportionate to the original cause. Early chapters cover the scope, limitations, and definitions involved in the design methodology; some general considerations of analysis and design; and minimum requirements for integrity. Other chapters provide information on foundations, floor and roof elements, walls, joints, and connections between precast members. Details of handling, assembly, and erection and special provisions for seismic and wind design are included. An appendix on site planning considerations, references, and a table of metric conversion factors are included.

PB80-810914 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Heat Loss Detection of Buildings. 1964-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Apr 80,
Guy E. Habercom, Jr. Jun 80, 85p
Supersedes NTIS/PS-79/0593 and NTIS/PS-78/0350.

The citations in this bibliography describe various methods for displaying or determining heat loss in residential buildings, commercial buildings, and house trailers. These methods disclose sources of heat loss such as structural defects, moisture spots, and other anomalies in building envelopes. Thermography, infrared detection, tracer gases, time-response methods, and statistical predictions are among the methods used for heat loss determination. (This updated bibliography contains 78 abstracts, 15 of which are new entries to the previous edition.)

PB80-811060 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Structural Foundations in Soils, Ice, Snow, and Permafrost. 1972-April, 1980 (Citations from the NTIS Data Base).
Rept. for 1972-Apr 80,
Guy E. Habercom, Jr. Jun 80, 343p
Supersedes NTIS/PS-79/0609 and NTIS/PS-78/0569. See also 1964-1971, NTIS/PS-75/282.

The design and dynamics of foundations, footings, and pile structures are reviewed in these research reports. The dynamic structural analysis of foundations in cold regions is investigated. (This updated bibliography contains 334 abstracts, 43 of which are new entries to the previous edition.)

14. METHODS AND EQUIPMENT

14A. Cost Effectiveness

AD-A083 668/4 PC **A02**/MF **A01**
Joint United States Military Assistance Group-Korea APO San Francisco 96302
Cost and Operational Effectiveness Analysis.
Professional paper,
Juri Toomepuu. 1978, 21p
Pub. in Jnl. of the Military Operations Research Society-Korea, v4 n1 p91-109 1978.

No abstract available.

14B. Laboratories, Test Facilities, and Test Equipment

AD-A083 789/8 PC **A02**/MF **A01**
Naval Weapons Center China Lake CA
The Adaptation of Color to Industrial Radiography (A Feasibility Study).
Technical memo.,
R. E. Monks. Oct 78, 17p NWC-TM-3634, GIDEP-E161-2211

It has been known for some time that certain chemicals luminesce when impinged by X- or gamma rays. The specific color and brightness of the luminescence thus produced is known to be a function of the chemical itself, the wavelength of the impinging rays, and the flux density of the impinging rays. Because of the inherent problems associated with reading conventional X-rays, it would be of great value to take advantage of the color luminescence phenomenon in producing the film images to be read during structural assessment. This memorandum is disseminated to report on the current state-of-the-art in producing color X-ray images. (Author)

AD-A083 796/3 PC **A02**/MF **A01**
Northwestern Univ Evanston IL Dept of Materials Science
X-Ray Techniques for the Measurement of Residual Stresses in the Real World.
Technical rept.,

Jerome B. Cohen. 8 Apr 80, 14p Rept no. TR-27
Contract N00014-75-C-0580

The principles of the X-ray method of measuring residual stresses are reviewed, with special emphasis on the latest developments in both procedures and equipment. Rapid in-the-field measurements are now being performed. It is possible to obtain stress gradients without layer removal and to obtain the entire stress tensor (not just the surface stress). (Author)

AD-A083 801/1 PC **A25**/MF **A01**
ARINC Research Corp Annapolis MD
Determination of the Feasibility of Replacing Special Purpose Test, Measurement, and Diagnostic Equipment with Off-the-Shelf Electronic Test Equipment. Volume II. Appendixes C and D.
Final rept. 1 Jun 79-28 Apr 80,
B. Moss, J. McCahan, and A. Simmons. Apr 80, 576p Rept no. 1581-01-1-2173-VOL-2
Contract DAAB07-78-A-6606

Computer printouts of operating and performance parameters are reproduced in this report. (Author)

AD-A083 874/8 PC **A02**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Capillary Flowmeters for Accurate, Stable Flows of Gases.
Technical rept.,
Mark A. Dewilde. Mar 80, 14p ARBRL-TR-02230, AD-E430 407

Capillary flowmeters have been used for a number of years now to meter gases into flow systems. This report describes a flowmeter/controller that is accurate to 1% and delivers a constant flow independent of delivery pressure between 0-0.10 MPa (0-15 psia).

AD-A083 931/6 PC **A05**/MF **A01**
Drexel Univ Philadelphia PA Dept of Mechanical Engineering and Mechanics
Generalized Approach to New Problems in Ultrasonic Inspection (GANPUI),
Joseph L. Rose, and Michael J. Avioli. 2 Apr 80, 90p NAEC-92-140
Contract N68335-78-C-1041

Generalized approach to new problems in ultrasonic inspection is detailed. It is an operator-computer interactive scheme involving application of latest techniques in ultrasonic inspection, pattern recognition, and minicomputer technology. (Author)

AD-A084 052/0 PC **A05**/MF **A01**
ARINC Research Corp Annapolis MD
Determination of the Feasibility of Replacing Special Purpose Test, Measurement, and Diagnostic Equipment with Off-the-Shelf Electronic Test Equipment. Volume I.
Final rept. 1 Jun 79-28 Apr 80,
B. Moss, A. Simmons, and J. McCahan. Apr 80, 93p Rept no. 1581-01-1-2173-VOL-1
Contract DAAB07-78-A-6606
See also Volume 2, AD-A083 801.

The work reported on herein was performed under a contract that is one of a group related to the CERCOM TMDE standardization effort. It was specifically directed toward determining the feasibility of substituting off-the-shelf electronic test equipment (general purpose TMDE) for special purpose TMDE. The study consisted of five interrelated tasks: Identify Special Purpose (SP) TMDE Assets, Update General Purpose (GP) TMDE Data Base, Determine Test Capabilities of Selected SP TMDE, Identify Common and Unique Test Requirements, and Determine Best Mix of Off-The-Shelf Electronic Test Equipment (OTS ETE) for Each Selected SP TMDE. The results are based on detailed examination of the technical performance characteristics of 20 SP TMDE selected from more than 1,000 items previously categorized as SP TMDE. The conclusions reached are as follows: a significant portion of the present inventory of SP TMDE could be replaced by a prudent selection of GP TMDE based on the 20 SP TMDE, and the use of groups of multipurpose GP TMDE in place of SP TMDE could result in significant cost savings (or avoidance).

AD-A084 065/2 PC **A02**/MF **A01**
California Univ Los Angeles Dept of Materials
Determination of Residual Stress by Magnetomechanical Acoustic Emission.
Technical rept.,
Kanji Ono, M. Shibata, and May M. Kwan. Apr 80, 22p Rept no. TR-80-01-ONR
Contract N00014-75-C-0419
Presented at the ASM Conference on Residual Stress for Designers and Engineers, Chicago, IL, 9-10 Aug 80.

This paper presents a newly discovered method for residual stress measurements. It applies to ferromagnetic materials only, but has a greater depth of penetration than X-ray diffraction and other methods, and is nondestructive. Materials under test are subjected to alternating magnetic fields. When internal structures of magnetic domains are altered, ultrasonic waves are generated; that is acoustic emission. This magnetomechanical acoustic emission (MAE) depends on the level of residual stress. It is also affected by the chemical composition, microstructure (heat treatment) and prior cold working of the material. Basic behavior and dependencies of MAE are to be described. Several applications will be discussed, including MAE measurements on structural shapes, welds and railroad rails. (Author)

ANL-CT-79-44 PC **A02**/MF **A01**
Argonne National Lab., IL.
Instruction Manual for ANL Passive Acoustic Flow Measurement System.
P. D. Roach. Oct 79, 23p
Contract W-31-109-ENG-38

The ANL Passive Acoustic Flow Measurement System is a signal processor designed to measure the flow rate of particles suspended in a gas. The intended application is the measurement of char flow at the BI-GAS Pilot Plant, Homer City, PA. An undetected flow stoppage can very quickly cause a dangerous temperature excursion in the gasifier. At the request of BI-GAS, Argonne National Laboratory (ANL) has developed and installed acoustic monitors which give rapid indications of blockages or other flow perturbations in the char lines. These monitors use a high temperature microphone for measuring the acoustic attenuation caused by the presence of char in the lines. This manual describes the components and gives instructions for installation and operation of the system. Figure 1 shows the components of the flow measurement system. Detailed discussion of the principle of operation and design of the flow monitor may be found in Technical Memorandum An Acoustic Char Flow Monitor for the BI-GAS Pilot Plant, ANL-FE-49622-TM08, July 1979. (ERA citation 05:014633)

ANL-FE-49622 PC **A03**/MF **A01**
Argonne National Lab., IL.
Investigation Leading to the Development of an Acoustic Doppler Slurry Flowmeter.
H. B. Karplus, and A. C. Raptis. Jun 79, 39p
Contract W-31-109-ENG-38

The Sonic Doppler shift principle is investigated for the measurement of high concentration coal slurries (5 to 40% solid). A noninvasive system having a transducer on the outside of the pipe is especially attractive for safety and convenience in operation and maintenance. The ideal single frequency scattered energy is not realized in practice but a broad band of scattered energy is observed. The spectrum has a definite maximum value close to the expected Doppler frequency. A single number output can be obtained by amplitude limiting the difference frequency between transmitted and received signal and counting zero crossings. (ERA citation 05:014678)

ANL-FE-49622-TM08 PC **A02**/MF **A01**
Argonne National Lab., IL.
Acoustic Char Flow Monitor for the BI-GAS Pilot Plant.
P. D. Roach, and A. C. Raptis. Jul 79, 23p
Contract W-31-109-ENG-38

The BI-GAS coal gasification pilot plant at Homer City, PA has an urgent need for monitoring char flow to the gasifier. An undetected flow stoppage can very quickly cause a dangerous temperature excursion in the gasifier. At the request of BI-GAS, the Argonne National Laboratory (ANL) has developed and installed acoustic monitors which will give rapid indication of blockages or other flow perturbations in the char lines. These monitors use a high temperature microphone, developed at ANL, for measuring the acoustic attenuation caused by the presence of char in the line. Such a measurement gives a sensitive indication of the amount of char flowing in the line and can be used for both process control and rapid detection of blockages. (ERA citation 05:014636)

IPP-III/41 PC **A02**/MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).
Unmodulated Interferometer.
D. E. Groening, N. Gottardi, and E. Rossetti. May 78, 13p
U.S. Sales Only.

This report describes a fast, unmodulated interferometer with a bandwidth exceeding 1 MHz which delivers two separate signals for the continuously represented amplitude and phase. (Atomindex citation 10:441972)

N80-22366/2 PC **A06**/MF **A01**
Old Dominion Univ. Research Foundation, Norfolk, VA.
Automatic Control of a Liquid Nitrogen Cooled, Closed-Circuit, Cryogenic Pressure Tunnel.
Progress Report, Oct. 1979 - Mar. 1980.
S. Balakrishna, and G. L. Goglia. Mar 80, 103p NASA-CR-162636
Grant NSG-1503

The control system design, performance analysis, microprocesser based controller software development, and specifications for the Transonic Cryogenic Tunnel (TCT) are discussed. The control laws for the single-input single-output controllers were tested on the TCT simulator, and successfully demonstrated on the TCT.

N80-22367/0 PC **A05**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
High Voltage Spark Carbon Fiber Detection System.
L. C. Yang. 15 Apr 80, 96p NASA-CR-162995, JPL-PUB-80-30
Contract NAS7-100

The pulse discharge technique was used to determine the length and density of carbon fibers released from fiber composite materials during a fire or aircraft accident. Specifications are given for the system which uses the ability of a carbon fiber to initiate spark discharge across a high voltage biased grid to achieve accurate counting and sizing of fibers. The design of the system was optimized, and prototype hardware proved satisfactory in laboratory and field tests.

N80-22368/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Magnetic Suspension and Balance System: A Selective Annotated Bibliography.
M. H. Tuttle, R. A. Kilgore, and R. P. Boyden. Apr 80, 47p NASA-TM-80225, L-13196

This bibliography, with abstracts, consists of 188 citations arranged in chronological order by dates of publication. Selection of the citations was made for their relevance to the problems involved in understanding, designing, and constructing magnetic suspension and balance systems for use in wind tunnels.

N80-22373/8 PC **A03**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
Tests on Pneumatically Powered Precision Force Generators.
R. D. Law. Jan 79, 35p RAE-TM-AERO-3449, RAE-TR-79013

The performance of two different types of pneumatic force generators was assessed covering forces up to a 100 kN, with a view to their use in balance calibrations in the RAE 5 m wind tunnel. Tests were performed on the force generators using a precision pneumatic control system, first in conjunction with a static balance test rig, followed

by a series of tests to check the overall accuracy of performance against the 'dead-weight' force standard machines. Force generators using a rolling diaphragm seal produce forces to an accuracy within 0.01% of maximum output assuming a linear calibration. Individual values of force output are repeated to 0.003% of maximum output when checked against a simple balance under fixed experimental conditions.

N80-22374/6 PC **A03**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (Germany, F.R.). Inst. fuer Entwurfs-Aerodynamik.
Gravimetric Investigation of the Particle Number Density Distribution Function in the High Speed Cascade Wind Tunnel for Laser-Anemometry Measurements.
H. Bessling, and T. Hinz. Jan 79, 39p DFVLR-FB-79-12
Text in German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-625).

The conditions in high speed cascade wind tunnels were investigated to determine for the use of laser anemometers in measuring flow velocities. The natural particle number density present in the cascade wind tunnel was found insufficient for the application of the laser method. The effect of adding aerosols to increase the number of particles in the wind tunnel is discussed.

N80-22660/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Aliased Noise in Radiometric Measurements.
F. O. Huck, S. K. Park, N. Halyo, and S. T. Stallman. May 80, 26p NASA-TP-1639, L-13410

The magnitude of aliased noise that degrades the accuracy of continuous reconstructions of discrete radiometric measurements was evaluated as a function of the spatial response and sampling intervals of the radiometer, and of the resolution of the reconstructed measurements. A Wiener spectrum, representative of a wide range of scenes, was used to characterize the radiance fluctuations.

N80-22714/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Simulation of Transducer-Couplant Effects on Broadband Ultrasonic Signals.
A. Vary. 1980, 36p NASA-TM-81489, E-427
Presented at Spring Meeting of the AM. Soc. Of Nondestructive Testing, Philadelphia, 24-27 Mar. 1980.

The increasing use of broadband, pulse-echo ultrasonics in nondestructive evaluation of flaws and material properties has generated a need for improved understanding of the way signals are modified by coupled and bonded thin-layer interfaces associated with transducers. This understanding is most important when using frequency spectrum analyses for characterizing material properties. In this type of application, signals emanating from material specimens can be strongly influenced by couplant and bond-layers in the acoustic path. Computer synthesized waveforms were used to simulate a range of interface conditions encountered in ultrasonic transducer systems operating in the 20 to 80 MHz regime. The adverse effects of thin-layer multiple reflections associated with various acoustic impedance conditions are demonstrated. The information presented is relevant to ultrasonic transducer design, specimen preparation, and couplant selection.

ORNL/TM-6864 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Design of Viewing Windows for Controlled-Atmosphere Chambers.
J. N. Robinson. Mar 80, 65p
Contract W-7405-ENG-26

A guide to the design of safe viewing windows is presented. Design criteria, the properties of materials, the problems of structural design in unreliable materials such as glass, the mathematics of reliability and redundance, and problems associated with testing windows are discussed, and formulas are presented for the design of windows. Criteria adopted at ORNL for controlled-atmosphere chambers are presented, a program for surveying and upgrading the safety of existing facilities is described, and the results of this program are reported. (ERA citation 05:016299)

ORNL/TM-6865 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Criteria for Controlled Atmosphere Chambers.
J. N. Robinson. Mar 80, 29p
Contract W-7405-ENG-26

The criteria for design, construction, and operation of controlled atmosphere chambers intended for service at ORNL are presented. Classification of chambers, materials for construction, design criteria, design, controlled atmosphere chamber systems, and operating procedures are presented. ORNL Safety Manual Procedure 2.1; ORNL Health Physics Procedure Manual Appendix A-7; and Design of Viewing Windows are included in 3 appendices. (ERA citation 05:016300)

PAT-APPL-6-135 040 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Langley Station, VA.
Wind Tunnel Supplementary Mach Number Minimum Section Insert.
Patent Application,
L. M. Couch. Filed 28 Mar 80, 12p N80-22369/6, NASA-CASE-LAR-12532-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A device which changes the Mach number capability of a wind tunnel without permanently altering the existing nozzle of the tunnel is described. An insert is attached to the wall of the existing nozzle expansion area creating a second minimum section upstream of the model test section. The added insert may be removed without complicated and expensive changes to the basic wind tunnel. In the embodiment illustrated, a removable insert is disposed within the wind tunnel nozzle walls with a portion of the flow boundary layer being bled off from the tunnel via a passageway and tunnel exit to reduce the extent of separated flow normally occuring upstream of the insert contraction section.

PATENT-4 194 150 Not available NTIS
Department of the Navy Washington DC
Method and Apparatus for Reducing Magnetometer Errors.
Patent,
Arthur W. Obenschain. Filed 26 Sep 58, patented 18 Mar 80, 7p AD-D007 201/7, PAT-APPL-763 758
Supersedes PAT-APPL-763 758-58.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to magnetometers and more particularly to a method and apparatus for reducing errors as a result of turnover and block misparabolism during the manufacture of a total field magnetometer. A total field magnetometer of the type contemplated by the present invention consists of three pairs of magnetometer elements arranged in three mutually perpendicular planes. Each of these magnetometer elements consists of a coil centered on a low retentivity magnetic core of high permeability. A suitable value of alternating current is applied to the coils in series. The reduction in inductance (reductance) of each coil from its value in zero magnetic field is proportional to the square of the field strength along its axis. Since the axes of the three pairs of coils are mutually perpendicular, the total inductance of the coils will be constant ideally regardless of the position in which the magnetometer is placed with respect to an external constant magnetic field. Stated differently, the total inductance of the magnetometer, regardless of its orientation in a magnetic field, is proportional to the sum of the squares of the three field components, and this sum is the square of the magnetic field strength sensed by the magnetometer. A perfect total field magnetometer thus can be subjected to any and all motions both translatory and rotative in a magnetic field of constant magnitude and its inductance will remain unchanged.

PB80-176977 PC **A04**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Div. of Physical Sciences and Engineering.
The Use of Light Scattering for the Detection of Filter Samples of Fibrous Aerosols.
Research rept.,
Paul A. Baron. Jan 78, 59p DHEW/PUB/NIOSH-78-105

The use of light scattering from fibrous dusts has been investigated. It has been found that straight fibers have a sufficiently distinctive scattering pattern that may be counted electronically. Curved fibers may also be detected by focusing the light source so as to illuminate only a small, relatively straight, section of the fiber. Theoretical and experimental information, as well as a proposed instrument, are presented in the report. The proposed instrument would fill a need in industrial hygiene to obtain rapid, accurate measurements of personal exposures to asbestos and other fibrous dusts.

PB80-177785 PC **A02**/MF **A01**
Environmental Sciences Research Lab., Research Triangle Park, NC.
A Microcomputer-Modified Electrical Aerosol Analyzer,
Charles W. Lewis. 26 Feb 79, 7p EPA-600/J-79-074
Pub. in Jnl. Aerosol Sci., v10 p471-475, 1979.

A commercial Electrical Aerosol Analyzer has been modified through addition of a digital voltmeter, a microcomputer, and a printer. In unattended operation, the system can acquire a differential particle size distribution, print and plot the resulting spectrum in any of three possible representations, and repeat the cycle at preselected intervals.

PB80-178049 Not available NTIS
National Bureau of Standards, Washington, DC.
Recent Progress in Eddy Current Testing.
Final rept.,
H. Berger, G. Birnbaum, and G. Free. 1980, 8p
Pub. in Proceedings of the International Symposium on New Methods of Non-Destructive Testing of Materials and their Application Especially in Nuclear Engineering, Saarbrucken, West Germany, September 17-19, 1979 p99-106 Mar 80.

The effectiveness of eddy current nondestructive testing is being enhanced by recent advances in theoretical analysis, new measurement methods, and the use of automation and computers for data analysis. Progress has been made in these areas as evidenced by papers presented at a Symposium held September 79 in USA. This paper presents a survey of the symposium papers related to the nuclear industry dealing with theory and applications of multifrequency techniques, automation methods and data analysis including pattern recognition. Those areas in which increased emphasis in further research appear to be profitable will be indicated.

PB80-178163 PC **A05**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Noise Abatement and Control.
Federal Laboratories and Research Facilities with Noise Capabilities.
Jul 79, 92p EPA-550/9-79-312

This directory provides government officials and others a basic reference guide to various Federal laboratories and research facilities having noise research and/or noise testing capabilities. The Environmental Protection Agency is publishing it pursuant to its responsibilities under the Noise Control Act of 1972 (PL 92-574) and the Quiet Communities Act of 1978 (PL 95-609).

PB80-179310 PC **A04**/MF **A01**
Fraunhofer-Gesellschaft, Grafschaft (Germany, F.R.). Inst. of Toxicology and Aerosol Research.
Design and Performance of an Aerosol Mass Distribution Monitor.
Final rept. 1977-1979,
W. Stober, F. J. Monig, H. Flachsbart, and N. Schwarzer. Mar 80, 53p EPA-600/2-80-053
Contract EPA-R-803592

An aerosol mass monitor has been built to measure the masses of non-volatile aerosols in the

range of 0.05 to 5 micrometers aerodynamic particle diameter. The instrument consists of a newly designed spiral duct aerosol centrifuge equipped with highly sensitive quartz sensors for in situ weighing of the deposited aerosol masses. The instrument further includes a clean air device for maintaining constant aerosol flow conditions, and electronic parts for the operation of the quartz sensors. The mass of aerosol deposited on the quartz crystals is automatically measured by an electronic counter while the rotor of the centrifuge continues spinning. The data are handled by a microprocessor.

PB80-180367 Not available NTIS
National Bureau of Standards, Washington, DC.
Telescopic Viewer in Syringe Calibration.
Final rept.,
F. E. Jones. Feb 80, 1p
Pub. in Anal. Chem. 52, p364 Feb 80.

A telescopic viewer was used in the calibration of a syringe for volumetric dispensing of methanol-water mixtures and methanol blanks into Karl Fischer titrator reaction vessels for determination of moisture content of materials. Using a 'gas-tight' 1 cc syringe filled to the 0.500 graduation with water, the mean volume dispensed for 15 observations was 0.50142 cc with an estimate of the standard deviation of the mean of 0.00015 cc and an estimate of the relative standard deviation of the mean of 0.00030.

PB80-181829 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. Office of International Relations.
Report to AID on an NBS/AID Workshop on Standardization and Measurement Services.
Final rept.,
H. Steffan Peiser, Charles C. Raley, and Penelope M. Odar. Apr 80, 67p NBSIR-80-2021
Grant PASA/TA(CE)6-71
Report on Workshop Held at Gaithersburg, MD on October 3-21, 1978. See also report dated Mar 77, PB-165 719.

The object of the Workshop was to give standards officials of industrializing nations insight into the standards and measurement systems of the United States and the role of the National Bureau of Standards, so that these officials might consider what parts of the U.S. system might usefully be adapted to conditions in their home countries. During the Workshop, papers were presented to exchange standardization experience from each participant's country. (These papers were previously published in NBS SP-543, the report on the UNCSTD seminar.) The presentations of the special evening speakers for the Workshop are featured in this report and also a special contribution by the representative from the Arab Organization for Standardization and Metrology. The other participants were from Argentina, Barbados, Brazil, Guyana, India, Indonesia, Jordan, Kenya, Korea, Pakistan, Panama, Saudi Arabia, Sudan, Tanzania, and Tunisia.

PB80-182132 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
The Calibration of Angle Blocks by Intercomparison.
Final rept.,
Charles P. Reeve. Apr 80, 27p NBSIR-80-1967

One service performed by the National Bureau of Standards is the calibration of angle blocks. Test blocks normally come in sets of 16 nominal sizes from 1 second to 45 degrees. Their angular values are calibrated by intercomparison with NBS master angle blocks and other test blocks of the same nominal size. Each test block is also measured for its maximum out-of-flatness and out-of-squareness. Statistical tests are performed in order to maintain control over the short-term and long-term variability of the measurement process. A complete description of the measurement process is given with special attention paid to the mathematical model for the measurements and the least squares estimation of the angular values. The method for determining the standard deviations of the short-term and long-term errors is also given.

PUC-tn-25/78 PC **A02**/MF **A01**
Pontificia Univ. Catolica do Rio de Janeiro (Brazil). Inst. de Fisica.
Simple Method for Checking the Balance of Gradiometers Used with SQUIDS.
I. R. Eghrari, and P. C. Ribeiro. Nov 78, 10p
U.S. Sales Only.

A simple technique for detecting the degree of balance of first-order gradiometers before connecting them to the SQUID is described. The effect of thermal cycling on this balance is given for different materials used in the construction of the gradiometers. (Atomindex citation 10:481331)

14C. Recording Devices

AD-A083 786/4 PC **A03**/MF **A01**
Army Missile Command Redstone Arsenal AL Research Directorate
Scan Recording of Kinetic Imagery for Cross Correlation and Stray Indication.
Technical rept.,
J. Lynn Smith. 3 Dec 79, 31p Rept no. DRSMI/RR-80-1

A technique for recording scanned, two dimensional imagery in only one horizontal line is presented. Successive horizontal lines are displaced slightly in the vertical direction so that time-evolution in the imagery may appear in a single two-dimensional record. Experiments were performed and data were taken to demonstrate cross correlation between recordings formed in this manner. A means was devised to indicate the nature of deviation in subject imagery from that used to form a reference record. (Author)

14D. Reliability

AD-A084 041/3 PC **A02**/MF **A01**
Desmatics Inc State College PA
An Investigation of a Statistical Procedure for Monitoring Two-Sample Life Tests.
Technical rept.,
Leslie A. Kalish, and Dennis E. Smith. Apr 80, 24p Rept no. TR-106-9
Contract N00014-75-C-1054

A statistical procedure is described for comparing two lifetime distributions when the data is reviewed repeatedly over time. The procedure provides the capability of early decision while maintaining both a fixed significance level and fixed maximum length for the entire experiment. The effects which staggered entry, number of looks at the data and maximum test length have on power and expected test length are discussed. An application is made to a bearing fatigue-life test. (Author)

14E. Reprography

PAT-APPL-6-136 660 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Method for Making Patterns for Resin Matrix Composites.
Patent Application,
M. J. Fontes. Filed 2 Apr 80, 13p N80-22410/8, NASA-CASE-ARC-11246-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A method for making laminate patterns for a resin matrix composite structural component is described. A sheet of paper is temporarily adhered to a model of the structural component. A tracer pen is positioned on the paper with an affixed spindle touching the model surface opposite the pen. The pen and spindle are moved along the path that maintains the aforementioned contacts. The resulting line traced on paper is a model constant thickness locus and provides a pattern for a single lamination of resin-impregnated fabric. The steps are repeated to make other patterns and each time the steps are repeated the distance between the tracer and the spindle is changed to correspond to the thickness of a lamination.

PATENT-4 184 078 Not available NTIS
Department of the Navy Washington DC
Pulsed X-Ray Lithography.
Patent,
David J. Nagel, and Martin C. Peckerar. Filed 15 Aug 78, patented 15 Jan 80, 4p AD-D007 206/6, PAT-APPL-933 928
Supersedes PAT-APPL-933 928-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington DC 20231 $0.50.

A method and means for x-ray lithography which utilizes means for producing in a vacuum system a high temperature plasma for which soft x-rays are emitted. The x-rays pass through a mask exposing an x-ray resist on a substrate to produce the desired pattern on the substrate. The x-ray spectrum has a significant energy in the 1-5 keV range. These x-rays pass through the support layer of the mask, stop in the pattern material (gold) of the mask or, where the pattern material is lacking, are absorbed adequately by the x-ray resist. Since there is very little energy above 5 KeV, there is little if any substrate damage due to the x-rays. (Author)

PB80-811151 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Microforms. 1973-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1973-May 80,
Mary E. Young. Jun 80, 221p
Supersedes NTIS/PS-79/0611 and NTIS/PS-78/0435. See also 1964-1973, NTIS/PS-75/434.

Reports on the development and use of microform materials are cited in the updated bibliography. Included are microfilm and microfiche format standards, utilization, and care. Much of this is discussed in relation to libraries, information centers, and educational institutions at all levels. (This updated bibliography contains 211 abstracts, 20 of which are new entries to the previous edition.)

UCRL-84027 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Microcomputer Controlled Isocon Camera System.
D. L. Dunbar. 27 Feb 80, 7p CONF-800502-2
Contract W-7405-ENG-48
26. international instrumentation symposium, Seattle, WA, USA, 5 May 1980.

An Isocon camera system is described which uses an 8080 microcomputer system for its control. Horizontal synchronized operational power supplies are used with a DAC for each channel of control. Each control function is entered by way of a key-board and software. Video information is digitized by a fast ADC and serialized to a low nibble and high nibble. Performance of the camera in terms of SNR and limiting resolution are discussed as well as block diagrams showing how the system was constructed. (ERA citation 05:017977)

15. MILITARY SCIENCES

15C. Defense

AD-A083 658/5 PC **A02**/MF **A01**
Joint United States Military Assistance Group-Korea APO San Francisco 96302
Defense Analysis in the United States.
Professional paper,
Juri Toomepuu. 6 Apr 79, 19p
Presented to the Korea Inst. for Defense Analyses at its Defense Analysis Methodology Seminar 6 Apr 79.

The paper discusses analysis agencies in the United States Department of Defense elements, Federal Contract Research Centers, and defense analysis conducted by private research corporation. As an example of analytical activities in a military service, an overview of the U.S. Army analysis agencies is given. The paper also describes the U.S. DOD and Army process for planning, programming, conduct, and reporting of studies, and provides a list of references pertaining to studies and analyses. (Author)

AD-A083 684/1 PC **A03**/MF **A01**
Royal Aircraft Establishment Farnborough (England)
Swedish Defence Research Abstracts 78/79-3 (Froe Foersvars Forsknings Referat 78/79-3).
1 Nov 79, 26p RAE-LIBRARY TRANS-2033, DRIC-BR-72935

Trans. from Research Institute for National Defence, Stockholm (Sweden), by D. P. Barrett.

No abstract available.

AD-A083 966/2 PC **A06**/MF **A01**
Oak Ridge National Lab TN
Blast Tests of Expedient Shelters in the MISERS BLUFF Event.
Final rept. Feb 78-Jan 80,
Cresson H. Kearny, Conrad V. Chester, and Edwin N. York. Jan 80, 116p ORNL-5541, DNA-POR-7019
Contracts DCPA01-78-C-0171, W-7405-eng-26

Expedient shelters were blast-tested by a conventional explosion equivalent to a 0.2 KT nuclear explosion. The estimated survivabilities in a large nuclear explosion are: (1) improved Small-Pole Shelter, 345 kPa (50 psi); (2) triangular entryway and blastdoor made of poles, 173 kPa (25 psi); (3) Chinese A-Frame Pole Shelter, 48 kPa (7 psi); and (4) lightly shored Pole-Covered Trench Shelters, 103 kpa (15 psi). (Author)

15E. Logistics

AD-A083 685/8 PC **A06**/MF **A01**
Management and Technical Services Co Philadelphia PA
Maintenance Task Identification and Analysis: Organizational and Intermediate Maintenance.
Final rept.,
Arnold E. Lobel, and Joseph F. Mulligan. Jan 80, 122p AFHRL-TR-79-50
Contract F33615-78-C-0015

This report provides a draft military specification for use by Air Force and other DoD agencies in specifying the requirements for maintenance task identification and analysis (MTI&A). Several new types of technical data, such as job guide manuals (JGMs) and logic free troubleshooting aids (LTTAs), have been adopted for use by the Air Force. The development of accurate and effective JGMs and LTTAs requires that a thorough MTI&A be accomplished to prepare the data base from which JGMs and LTTAs are developed. At present there is no suitable specification available to establish MTI&A requirements for use in procuring JGMs and LTTAs. The draft specification was developed to fill this need. A thorough review of the state-of-the-art in performing the MTI&A was accomplished to provide the basis for developing the draft specification. This was accomplished by first reviewing the literature in the area and then conducting extensive interviews with government and industry personnel who are knowledgeable of and experienced in current MTI&A procedures. Interviews were conducted with industry personnel who have had experience in conducting research to develop MTI&A procedures, and with personnel who have had experience in managing and conducting MTI&A programs. Interviews were also conducted with Air Force and Army personnel who have had experience in procuring MTI&A based technical data. The results of the literature review and interviews were analyzed and used to provide the basis for developing the MTI&A requirements included in the specification.

AD-A083 691/6 PC **A04**/MF **A01**
Logistics Studies Office (Almc) Fort Lee VA
Major Item Price Update Procedures.
Final rept.,
Joseph A. Dodge. Dec 79, 53p

This study outlines a procedure for developing and maintaining current year LIN level planning prices for the 4,000 plus LINs representing over 6,400 NSNs, of Class VII major items in the Army inventory as listed in Chapter 2, SB 700-20. Approval of the recommended procedure, with publication in and an annual price update of SB 710-1-1, Standard Study Number System, would provide the current year base price to which planners would apply inflation guidance for out-year pricing of materiel acquisitions. (Author)

AD-A083 708/8 PC **A14**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
Optimization of Munitions Storage.
Master's thesis,
Barton A. Boggs, and Louis M. Gusmus. Dec 79, 316p Rept no. AFIT/GSM/SM/79D-15

The problem of how to store as much as possible of a required munitions inventory in a given storage area is addressed by the formulation of a mixed integer linear programming model that will calculate optimal storage subject to a complex set of constraints. The Munitions Storage Optimization System (MSOS) provides a capability for setting up munitions storage optimization linear programming problems. MSOS allows the user to create data bases containing the required information for the munitions inventory items and the storage buildings. Munitions inventory is entered by stock number, number of lots, and number of packages for each lot. A program extracts the necessary information from the data bases, formulates the objective function and constraint equations, then submits the problem to a mixed integer linear programming package for calculation of the solution. (Author)

AD-A083 739/3 PC **A03**/MF **A01**
Logistics Management Inst Washington DC
Administrative Support Airlift Policy,
Robert D. Kaiser, Eugene A. Narragon, and Robert K. Wood. Nov 79, 45p Rept no. LMI-ML912
Contract MDA903-77-C-0370

This study proposes new OSD policy and implementing instructions on administrative support airlift for the Military Services. Each Service has its own definition of ASA, its own inventory of ASA aircraft, and its own policies for acquisition, retention, assignment and use of ASA. ASA should be uniformly defined as all airlift transportation in support of command, installation, or management functions. (Author)

AD-A083 759/1 MF **A01**
Air Force Maintenance and Supply Management Engineering Team Wright-Patterson AFB OH
LCOM II Simulation Software Users Reference Guide,
William F. Drake, III , and Raymond C. Reiss. 12 Oct 79, 446p Rept no. AFMSMET-78-5.1
See also Rept. no. AFMSMET-78-5 and AD-703 328 and AD-A003 211.
Availability: Microfiche copies only.

The logistics Composite (LCOM II) simulation software is a composite of individual programs or modules written in SIMSCRIPT II which communicate directly with each other and function as a unit. This software was designed to apply simulation to studies concerning Air Force base level functions, e.g. operations, maintenance and supply. Through simulation the impact of the availability of all types of support resources on the operational status of a weapon system can be assessed. The LCOM II software together with the data representing a weapon system's environment from study models that permit the analysis of weapon system support requirements. The LCOM II simulation software is composed of distinct modules; the Input Module that preprocesses the data, the Main Module that conducts the simulation and the Post Processor Module that includes several individual post processor programs providing post simulation analysis and data displays. All modules of the LCOM II simulation software are described in detail, and a step by step approach for preparing the input forms is discussed.

AD-A083 762/5 MF **A01**
International Applied Science and Technology Associates Inc Evanston IL
The Leader/Follower Concept in Systems Acquisition.
Final rept.,
Charles W. N. Thompson, and Albert H. Rubenstein. 15 Nov 79, 128p
Contract F33615-79-C-5073
Availability: Microfiche copies only.

The objectives of this study were to: assess the experience in DOD with use of the Leader/Follower concept, evaluate views of acquisition and contracting managers in both industry and government about the concept, and to develop guidance for acquisition manager's use of the concept for complex products and systems. To meet the objectives of this study, the researchers conducted an extensive review of policies, regulations and legal documentation both directly and indirectly related to the Leader/Follower Concept and 'Leader Company Procurement.' The researcher also interviewed government and industry managers about their experience with the concept and their viewpoints toward its use for complex systems requiring high investment in front-end research and development. While Leader/Follower has been used at least since World War II, current use appears to center on two related decisions. The first is a decision to develop a second source usually to reduce and control cost or assure supply. Cost objectives are usually achieved when production lasts for an extensive time. Assurance of supply arises as an objective due to known or anticipated characteristics of the developer/producer.

AD-A083 804/5 PC **A03**/MF **A01**
Logistics Management Inst Washington DC
Affordability for Major System Acquisitions,
William G. Moeller. Jan 80, 30p Rept no. LMI-RE903
Contract MDA903-77-C-0370

The objective of this study was to develop a management approach for addressing the affordability problem in the procurement funding area. It was concluded that affordability determinations must be the responsibility of the PPBS resource allocation process because affordability deals principally with the question of how to allocate finite budget resources to competing programs. DSARC's role in affordability should be supportive of the PPBS. It was also concluded that there is a need to establish a 15-year baseline procurement program for each Service. It was recommended that OSD develop an affordability analysis procedure for each Service to use in establishing its own 15-year baseline procurement program. Such a procedure was developed, based on the use of an affordability matrix for the procurement appropriations of each Service. It allocates forecasted procurement resources to programs for a 15-year period based on program priority and cost, thereby establishing a 15-year baseline procurement program for each Service. (Author)

AD-A083 845/8 MF **A01**
Naval Weapons Engineering Support Activity Washington DC
Life Cycle Cost Guide for Equipment Analysis.
Jan 77, 181p
Availability: Microfiche copies only.

The Life Cycle Cost Guide for Equipment Analysis updates and supercedes the Life Cycle Cost Guide for Government Furnished Equipment and its associated Customer Support Package. This document differs extensively from the previous guide in cost model structure, in equation and cost factor description, and in computer program structure. The major changes are: (1) The total Life Cycle Cost was divided into three major cost elements: Research & Development, Investment, and Operation & Support; (2) The entire Cost Breakdown structure was revised, new cost elements were added, and new equations and cost factors were introduced. Program Management and Termination Costs have also been included; (3) Four types of yearly inflation rates (Research and Development Procurement, Military Construction, and Operation and Maintenance) and yearly discount rates were included to calculate costs in terms of inflated or inflated & discounted dollars; (4) A new computer program has been developed for this Guide; (5) The new computer program enables the analyst to modify the standard Life Cycle Cost Model to his specific project needs without making any program changes. The format of the reports is automatically adjusted for all changes.

AD-A083 851/6 PC **A08**/MF **A01**
Naval Postgraduate School Monterey CA
A Comparative Analysis of the Turkish Navy and the U.S. Navy Budgeting Processes,
Master's thesis,
Ibrahim Ozturk. Dec 79, 163p

This thesis presents an overview of the budgeting process including the planning, programming, and budgeting (PPB) phases in both the U.S. Navy and the Turkish Navy. It provides the information necessary for a basic understanding of PPB functions and their components or phases, management

structures and procedures, and the major legislation and regulations involved in the budgeting process. It also provides a comparative discussion of the problem encountered in the budgeting process by both Navies and recommends general solutions for these problems. (Author)

AD-A083 901/9 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
A Review of the R.O.K. Decision to Coassemble F-5E/F Aircraft.
Master's thesis,
Kun Woo Yu. Mar 80, 117p Rept no. AFIT/GSM/SM/80M-16

This study reviews the proposed F-5E/F coassembly program by the ROK. The review is conducted within the context of the historical trend of U.S. security assistance to the ROK and ROK military and economic needs and objectives. Program analysis and assessment include an evaluation for the potential of the coassembly program to fulfill ROK needs and objectives. Assessment is further augmented by a review of lessons learned by ROC and Japanese coproduction/coassembly programs with the U.S. Finally, the author identifies potential areas and makes recommendations for solutions. (Author)

AD-A083 942/3 PC **A03**/MF **A01**
Washington Headquarters Services (DOD) DC Directorate for Information Operations and Reports
Military Manpower Statistics as of November 1979.
Mar 80, 38p

MILITARY MANPOWER STATISTICS presents audited statistical data pertaining to active duty military, reserve components, and retired military personnel of the Department of Defense. The publication is generated from a computerized data base developed and maintained by the Manpower Management Information Division of WHS/DIOR.

AD-A083 969/6 MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
An Investigation of Productivity Measures for the Peacetime MAC Airlift System Using System Simulation.
Master's thesis,
Philip A. Richard. Mar 80, 142p Rept no. AFIT/GST/OS/80M-3
Availability: Microfiche copies only.

Currently, the measures of performance used by the Military Airlift Command, in particular departure reliability, emphasize activities. In so doing the productivity of the MAC airlift system is overlooked. A factorial design experiment was conducted with a simulation model of a portion of the MAC airlift system. Results from this experiment indicate that an activity index like departure reliability does not track system output, and, consequently, should not be regarded as a measure of system productivity. A set of productivity ratio indices was computed using the model input/output data from the system simulation. By emphasizing the relationship between output and input these ratio indices highlight system productivity and enable the MAC Commander or the airlift managers to make appropriate decisions regarding system productivity. In addition, productivity ratio measures have the potential for improving contingency planning by providing planners the ability to relate required output capacity to needed input resources, and also to determine output capacities constrained by input resources. (Author)

AD-A083 979/5 PC **A03**/MF **A01**
Logistics Management Inst Washington DC
Depot Maintenance Performance,
E. A. Narragon, and D. M. Kennelly. Nov 79, 49p Rept no. LMI-ML914
Contract MDA903-77-C-0370

This study proposes a data processing tool for use by the Department of Defense in assessing depot maintenance cost and productivity. The capabilities required for effective DoD use of depot performance data are described along with a data processing design to provide those capabilities. The results of a sample application of the data processing system are presented and analyzed. To produce a complete depot maintenance analysis capability, the DoD should take the following actions: (1) Investigate the development of depot cost and performance data and take steps to insure uniformity; (2) Refine the proposed depot performance system by developing additional performance indicators and more concise, useful management reports; and (3) Develop complementary data processing systems to provide depot budget and capacity data. When these efforts are complete, an extensive analysis of depot maintenance is recommended. (Author)

AD-A084 035/5 PC **A06**/MF **A01**
George Washington Univ Washington DC Program in Logistics
An Optimization Technical for a Multitime Period Spares Provisioning Problem,
Harold Kalman Rappoport. 7 Feb 80, 116p Rept no. SERIAL-T-408

This work contains an algorithm that yields an exact solution to a spares provisioning problem that was 'solved' previously using a heuristic algorithm. After presenting the backgrounds of the underlying gas turbine engine maintenance problem and the heuristic approach, a discussion of the techniques developed here to solve the problem exactly is presented. It is shown that the problem can be set in a form amenable to solution by a branch and bound procedure. In order to solve the subproblems, it is necessary to characterize the constraint region for each time period. An enumeration scheme, together with the concept of a 'corner' is introduced to accomplish this. Finally, dynamic programming is used to obtain the optimum of each subproblem associated with the branch and bound approach. Computational results are given for four problems. Three of these problems are modifications of the basic problem; they are presented to demonstrate the nature of the solution technique. The fourth problem is identical to a problem previously solved with the heuristic algorithm. Extensions to the original problem are then discussed.

AD-A084 054/6 PC **A06**/MF **A01**
Defense Logistics Agency Alexandria VA Analysis Div
Logistic Systems Studies Handbook.
Feb 73, 109p

The study assignment, whether or not formally designated a Task Order and regardless of the issuing office, provides general direction on the study's nature and designates who will prepare the study. Since a study assignment is issued by a relatively high level official and followed, shortly, by a considerably more detailed 'Study Plan' (see Chapter II), emphasis in the development of the study assignment should be oriented primarily toward the reasons for its establishment and based on minimum research into the subject area involved.

PB80-177892 PC **A07**/MF **A01**
National Park Service, Denver, CO. Branch of Historic Preservation.
Historic Structure Report: U.S. Army San Francisco Port of Embarkation Headquarters, FM-201, Historical and Architectural Data Sections, Fort Mason, Golden Gate National Recreation Area, San Francisco, California,
David E. Snow, and Erwin N. Thompson. 1979, 139p FNP-560-80-4

The Architectural data section describes structure FM-102 as reflecting the typical military style architecture of the early 1900's through WWII. It includes a probable construction chronology, description of existing conditions and recommendations for restoration and preservation. At the end of the sections can be found the bibliography, illustrations and historic, existing and adaptive restoration drawings and the enabling legislation.

15F. Nuclear Warfare

AD-A083 769/0 PC **A02**/MF **A01**
Army Nuclear and Chemical Agency Springfield VA
The Army Nuclear Survivability Program,
Joe A. Sims, Jr., and Anthony F. Portare. Jan 80, 13p Rept no. NUCLEAR NOTES-2
Supersedes rept. no. NUCLEAR NOTES-2, AD-A023 776.

Topics considered include: Nuclear Survivability; Nuclear threats; Nuclear Weapon vulnerabilities of personnel and equipment.

15G. Operations, Strategy, and Tactics

AD-A083 787/2 PC **A03**/MF **A01**
Army Missile Command Redstone Arsenal AL Advanced Systems Concepts Office
A Parametric Model for the Effect of White Phosphorus Smoke on Target Detection. I. Model Development.
Technical rept.,
Bruce W. Fowler, and Thomas B. Owens. 18 Oct 79, 47p Rept no. DRSMI/0-80-2

The development of a parametric model for target acquisition in white phosphorus smoke is described. Parameters include wind speed and direction, stability category, and munition size. The model depicts critical cloud dimensions that prohibit target acquisition. Use of the model in simulations is described. (Author)

AD-A083 911/8 PC **A06**/MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
STAG: A Two Person Simulated Tactical Air War Game.
Master's thesis,
John Matthew Foley. Mar 80, 116p Rept no. AFIT/GST/OS/80m-2

The model developed in this study is a highly aggregated theater-level game comprised of interaction equations which utilize the allocation of aircraft to various missions on a daily basis to obtain the outcome of an offensive versus defensive systems engagement. The simulation which supports the model consists of an interactive air portion and a parametric ground portion. The theater of operations consists of two sides with their respective air and ground forces. While the model produces credible outcomes, the main objective is to reflect the effect of strategy and employment tactics on the outcome of the battle. The model is designed to provide individuals an opportunity to plan and conduct an air war and to test various air employment concepts. Existing war games are quite large and contain so many factors that the main effects of a player's employment decisions are confounded by the interactive effects of the factors. The war game described in this report has a limited number of factors so that it is easier for players to determine the main effects of their strategies. Included in the appendicies are a user's guide, analytical formulations, and a source listing of the program. (Author)

AD-A084 024/9 PC **A06**/MF **A01**
Naval Postgraduate School Monterey CA
An Examination and Evaluation of the Concepts of the Tactical Air War Analysis Game (TAWAG). An Analytical 'Quick Game Model' for the Assessment of Long-Range Air Armaments Policy Options (to be Published).
Master's thesis,
Detlef Erhard Leger. Dec 79, 110p

The purpose of this thesis is to investigate and review the basic model structure of a tactical air-ground combat model, the 'Tactical Air War Analysis Game' (TAWAG). Existing theater level air/ground combat models (both descriptive and prescriptive) are reviewed and compared with TAWAG on the basis of a number of criteria. Whenever possible an effort is made to draw connections to existing models or point out the differences. The goal of this effort is to present a clear conceptual picture of the TAWAG model and to compare its 'heuristic programming' optimization methodology with those used in other models currently used in the USA. (Author)

AD-A084 038/9 PC **A05**/MF **A01**
SDC Integrated Services Inc San Diego CA
STAMMER2 Production System for Tactical Situation Assessment. Volume 1. Design Description.
Technical document Jun-Sep 79,

D. C. McCall, P. H. Morris, D. F. Kibler, and R. J. Bechtel. Oct 79, 85p NOSC-TD-298-VOL-1
Contract N00123-76-C-0172

STAMMER2 is a revised version of STAMMER, a System for Tactical Assessment of Multisource Messages, Even Radar. STAMMER was created as part of an investigation of new correlation methodologies, and served as a testbed for explorations of applications of rule-based inference systems to the tactical situations assessment (TSA) problem. STAMMER concentrated on the specific task of merchant detection from radar and external messages. Experience with STAMMER revealed areas for improvement, which have led to the creation of STAMMER2. In addition to several changes in the underlying rule mechanisms used, the enhancement found in STAMMER2 arose out of a desire for greater generality and flexibility in the demonstration system, the explanation system, and the range of acceptable inputs to the system. STAMMER2 should prove to be a more useful system for testing various rule/scenario collections. During the development that led to STAMMER2, further issues in the design of rule-based inference systems for use in support of C3 activities have become apparent and they are discussed. This volume consists of the design description Volume 2 consists of the code. (Author)

AD-A084 053/8 PC **A10**/MF **A01**
Sdc Integrated Services Inc San Diego CA
STAMMER2 Production System for Tactical Situation Assessment. Volume 2. Code.
Technical document Jun-Sep 79,
D. C. McCall, P. H. Morris, D. F. Kibler, and R. J. Bechtel. Oct 79, 218p NOSC-TD-298-VOL-2
Contract N00123-76-C-0172
See also Volume 1, AD-A084 038.

STAMMER 2 is a revised version of STAMMER, a System for Tactical Assessment of Multisource Messages, Even Radar. STAMMER was created as part of an investigation of new correlation methodologies, and served as a testbed for explorations of applications of rule-based inference systems to the tactical situation assessment (TSA) problem. STAMMER concentrated on the specific task of merchant detection from radar and external messages. Experience with STAMMER revealed areas for improvement, which have led to the creation of STAMMER2. In addition to several changes in the underlying rule mechanisms used, the enhancements found in STAMMER2 arose out of a desire for greater generality and flexibility in the demonstration system, the explanation system, and the range of acceptable inputs to the system. STAMMER2 should prove to be a more useful system for testing various rule/scenario collections. During the development that led to STAMMER2, further issues in the design of rule-based inference systems for use in support of C3 activities have become apparent and they are discussed. This volume consists of the code. Volume 1 consists of the design description. (Author

16. MISSILE TECHNOLOGY

16D. Missiles

AD-A083 785/6 PC **A09**/MF **A01**
Army Missile Command Redstone Arsenal AL Technology Lab
Investigation of Disturbance Accommodating Controller Application to a Missile Autopilot.
Technical rept.,
Wayne L. McCowan. 31 May 79, 190p Rept no. DRSMI-T-79-63

The Disturbance Accommodation Controller (DAC) uses a combination of waveform-mode disturbance modeling and state-variable control techniques. This approach permits three primary modes of disturbance accommodation: cancellation (absorption) of disturbance effects, minimization of disturbance effects, or constructive utilization of the disturbances as an aid in accomplishing the primary control task. It is possible to minimize the effects of the disturbances modeled in this report by use of DAC techniques. It is also possible to combine two separate DAC's designed for disturbances at different places in the plant, into a functioning unit which would still perform its overall purpose. However, the true test of how a DAC would function in a system application would be to implement one in a 6-DOF simulation and fly it with a severe program of varying disturbance vectors. (Author)

N80-22396/9 PC **A04**/MF **A01**
European Space Agency, Paris (France).
The Use of Ram Rockets for High Altitude Missiles.
E. Riester. Dec 78, 72p ESA-TT-505, DLR-FB-77-47
Transl. into English of "Die Anwendung von Staustrahlraketen bei Flugkoerpern in Groesseren Hoehen", Rept. Dlr-FB-77-47 Dfvlr, Brunswick (Germany, F.R.), Oct. 1977. Original Report in German Previously Announced as X79-71390.

The conditions under which a ram rocket is superior to a rocket as a power plant for the cruising phase of high altitude supersonic missiles are analyzed and defined. The influence of mission and power plant parameters on the payload of both kinds of engine units is investigated. The advantages of a booster-ram rocket combination over a two-stage rocket are pointed out. This advantage can be increased if the booster acceleration is terminated before the cruise velocity is reached and the ram rocket then continues the acceleration. In that case, the payload attains a maximum at a particular final booster velocity. The working regimes in the ram rocket combustion chamber needed to obtain these optimal conditions are deduced.

17. NAVIGATION, DETECTION, COMMUNICATIONS, AND COUNTERMEASURES

17A. Acoustic Detection

AD-A083 677/5 PC **A05**/MF **A01**
Naval Ocean Systems Center San Diego CA
LIRA: A Model for Predicting the Performance of Low-Frequency Active-Sonar Systems for Intermediate Surveillance Ranges.
Final rept. Dec 76-May 79,
D. W. Hoffman. Jun 79, 99p Rept no. NOSC/TD-259

LIRA is a computer model developed to predict the performance of active-sonar systems for intermediate-range surveillance. The program provides a series of outputs as a function of target range. Propagation loss (incoherent and largest arrival), reverberation level, and signal excess are provided in both printed and plotted forms. Other printed outputs are two-way travel time to the target, angle of largest ray arrival at the source, signal level at the output of the beamformer, signal-to-noise ratio, and probability of detection. Reverberation plots show surface, bottom, and volume components as well as total reverberation and competing noise level. Source and receiver are not required to be at the same depth. Target ranges may extend from 1 yd to 1000 kyd; a maximum of 500 target ranges are allowed per run. Source frequency is allowed to be between 25 Hz and 25 kHz. Pulse length may be between .0001 and 100 s. The sound-speed profile is represented by curvilinear segments to eliminate false caustics. The sound-speed profile is assumed to be constant with range and the ocean bottom horizontal. The propagation loss models are ray theory supplemented with caustic corrections derived by Brekhovskikh, and empirical equations based on the AMOS data and corrected for low frequencies using normal mode theory. Beam patterns for both transmitter and receiver are incorporated into propagation loss. The Hall-Watson model is used for absorption loss. Surface backscattering strength is a combination of the Chapman-Harris equations, Eckart's equations, and Richter's data. Bottom backscattering strength is derived from Lambert's law and Schmidt's data. Volume backscattering strength is represented as the column strength.

AD-A083 704/7 PC **A04**/MF **A01**
Texas Univ At Austin Applied Research Labs
Parametric Acoustic Receiving Array (Parray) Research and Experiments.
Final technical rept. 6 Mar 78-5 Mar 79,
Tommy G. Goldsberry, David F. Rohde, C. Richard Reeves, Robert A. Lamb, and M. Ward Widener. 6 Feb 80, 69p Rept no. ARL-TR-80-7
Contract N00039-78-C-0121

Research and development of and experiments with parametric acoustic receiving arrays (PARRAYs) are reviewed. One task involved design, construction, and installation of a PARRAY aboard the research submarine USS DOLPHIN for tests and experiments. A second task involved design and development of hardware for experiments with a large aperture, bottom mounted PARRAY at sea. Publications and reports describing the work in detail are reviewed and referenced. (Author)

AD-A083 957/1 PC **A10**/MF **A01**
Wagner (Daniel H) Associates Paoli PA
The Theory of SCREEN.
Final rept. 1976-1980,
David C. Bossard, and Larry K. Graves. Mar 80, 202p
Contract N00014-76-C-0811

This report documents the theory which underlies the SCREEN program, a computer program designed to evaluate acoustic detection and localization performance of an anti-submarine protective force about a Naval task force or other shipping. A companion user's manual for SCREEN supplements this report. The measures used to evaluate the SCREEN performance are: cumulative detection probability against specific target approach tracks and cumulative localization performance against these same tracks. In addition to cumulative measures, 'snapshot' detection and localization measures are also computed, which provide an indication of the detection and localization coverage of the defensive screen at a specified time. The SCREEN program operates on data files which contain moderately detailed descriptions of the acoustic environment (propagation, noise, etc.), the sensor parameters and tactics, and the screen penetrator (target) parameters and tactics. These descriptions include both deterministic and stochastic parameters. The data file contents can be created, altered, and displayed by the user under program control. Once the data files have been created, subsequent use of SCREEN is straightforward and concise, involving user-selectable program options and machine prompts for input. The underlying detection process is a modified (lambda, sigma)-jump process. The target process is a modified Integrated Ornstein-Uhlenbeck (IOU) process. The basic localization algorithm is an 'Information Flow' Kalman filter. Bayesian updating techniques are used to evaluate search effort, along lines similar to techniques found in computer assisted search programs which are currently being implemented in the Fleet. (Author)

PATENT-4 169 257 Not available NTIS
Department of the Navy Washington DC
Controlling the Directivity of a Circular Array of Acoustic Sensors.
Patent,
David A. Smith. Filed 28 Apr 78, patented 25 Sep 79, 11p AD-D007 187/8, PAT-APPL-900 959
Supersedes PAT-APPL-900 959-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Forming and directive control of the beam in a circular sonar array without time delay or phase shift networks. Predetermined weighting coefficients are used to scale sensor outputs that are summed in an add-only processor to provide a weighted sum output characteristic of target position relative to the main receiving axis of the array. (Author)

PATENT-4 195 280 Not available NTIS
Department of the Navy Washington DC
Tuned Electrolytic Detector.
Patent,
Herbert V. Hillery. Filed 5 May 55, patented 25 Mar 80, 5p AD-D007 202/5, PAT-APPL-506 391
Supersedes PAT-APPL-506 391-55.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $-.50.

This invention relates to a tuned electrolytic detector and more particularly to a pressure sensitive

electrolytic cell of a character in which increased sensitivity to pressure changes applied thereto may be obtained throughout a predetermined controlled frequency band, thereby increasing the sensitivity in the desired controlled frequency band for devices such as acoustic filters in which the tuned electrolytic detector is used. More particularly, it is a purpose of this invention to provide a high d.c. electrical output sensitivity to acoustic pressures by mounting the cathode assembly of the detector on a flexible internal diaphragm for movement therewith. The instant diaphragm is of an inert material and disposed within the detector cell in a manner to effectively provide a separation between the two electrolyte concentrations on opposite sides thereof, and in which arrangement of structure the normal flow path is through an orifice in the mass of the cathode box.

PATENT-4 195 361 Not available NTIS
Department of the Navy Washington DC
Variable Frequency Acoustic Filter.
Patent,
Herbert V. Hillery. Filed 27 Apr 56, patented 25 Mar 80, 8p AD-D007 203/3, PAT-APPL-581 261
Supersedes PAT-APPL-581 261-56.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to an hydroacoustic filter device for use with underwater acoustic detecting mechanisms of a character adapted for inclusion in naval mine mechanisms. More particularly the instant hydro-acoustic filter is of a character adapted to provide selection of a plurality of different band pass frequencies to render the mechanism effective in response to signals from targets of predetermined selectable acoustic frequency bands indicative of certain types of target vessels. The instant filter system is of a character well adapted for usage with an electrolytic detector and this type of detector may be incorporated in a common housing with the filter mechanism herein to be described. A detector cell is a device which utilizes the phenomenon known as 'concentration polarization' to detect and/or indicate flow in a solution containing oxidizable and reducible ions. Examples of suitable redox systems are: ferricyanide-ferrocyanide, ceric-cerous, ferric-ferrous, or iodine-iodide. If an iodine-iodide solution is employed the cathodic reduction of iodine is made the controlling reaction by using a low concentration of iodine about 0.1 N and a relatively high iodide concentration about 0.5 N. When the solution is quiescent, the current is controlled by diffusion. If however, fluid flow of the electrolyte increase, the number of iodine ions available at the cathode increases thereby increasing the current in the system. This fluid flow is usually induced by flexure of a diaphragm in contact with the solution which flexure may be initiated by heat, mechanical pressure or acoustical pressure. The increase of current in the system can therefore be equated to the heat or pressure which caused flexure of the diaphragm.

PATENT-4 198 703 Not available NTIS
Department of the Navy Washington DC
Submarine Simulating Sonar Beacon.
Patent,
Peter Huisveld, Jr., and Milton D. Papineau. Filed 12 May 60, patented 15 Apr 80, 19p AD-D007 207/4, PAT-APPL-028 810
Supersedes PAT-APPL-028 810-60.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington DC 20231 $0.50.

This invention relates generally to submarine boat simulating decoys and in particular to a sonar system for receiving the acoustical search pulse of an adverse or other vehicle and converting it into an elongated signal corresponding to the pulse that would be reflected from an actual maneuvering submarine boat and broadcasting said elongated signal back to said vehicle for deception and decoy purposes. In order to facilitate the training of sonar operators or the deception of an enemy conducting underwater warfare, it is often desirable and sometimes necessary to employ submarine vehicles that simulate the characteristics of actual submarine boats of the combat type in lieu of using real submarine boats themselves. So doing not only substitutes a lesser expensive and more portable device for a real submarine boat needed for other tasks in the former instance but makes use of a more expendable device as a decoy means, whereby life and more valuable property may be saved in the latter case.

17B. Communication

AD-A083 754/2 MF **A01**
National Aviation Facilities Experimental Center Atlantic City NJ
Development of an Automated Remote Communications Air-Ground (RCAG) Monitoring System.
Final rept. Mar 78-May 79,
Nicholas J. Talotta, and Albert J. Rehmann. Apr 80, 101p FAA-NA-79-44, FAA-RD-79-125
Availability: Microfiche copies only.

A monitoring System for remote communication air-ground (RCAG) facility equipment was developed, including the design and fabrication of an engineering model. Sensor techniques for the transmitters and receivers were investigated. The design made use of a microprocessor with associated hardware and software to 'continuously monitor' critical parameters. Certification data and/or alarms were reported via a terminal. It is concluded that production of automated monitoring equipment for Federal Aviation Administration (FAA) air/ground communication facilities with the specific sensor techniques, processing, and control used in this experimentation is feasible. (Author)

AD-A083 852/4 PC **A05**/MF **A01**
Naval Postgraduate School Monterey CA
An Investigation of Distributed Communications Systems and Their Potential Applications to Command and Control Structure of the Marine Corps.
Master's thesis,
Edmund Andrew Lucke. Dec 79, 84p

The Marine Corps Tactical Command and Control System (MTACCS) is expected to provide increased decision making speed and power through automated processing and display of data which previously was processed manually. The landing Force Organizational Systems Study (LFOSS) has challenged Marines to examine how Command and Control will be exercised, and what the organizational impact will be of MTACCS. This thesis is aimed primarily at the post MTACCS concepts of Command, Control and Communications (C3). It has been heavily influenced by the areas of concern which the acquisition of MTACCS has generated. The areas of mobility, maintainability, survivability and implementation are all areas in which distributed systems hold promise of improvement upon those provided by the hierarchically structured MTACCS architecture. Here we examine the required architecture for a second generation automated C3 system entitled the Mobile Command Concept (MCC). (Author)

AD-A083 887/0 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Software Engineering Techniques Applied to Protocol Simulation.
Interim rept.,
C. E. Landwehr. 19 Feb 80, 15p NRL-8385, AD-E000 399

The design, implementation, debugging, validation, use, and modification of a computer simulator for the study of satellite communication protocols are reported. An important objective of the effort was to apply state-of-the-art software engineering techniques in the design and construction of the simulator. Experience with seven specific techniques is described.

AD-A083 935/7 PC **A04**/MF **A01**
Computer Systems Management Inc Arlington VA
The Design and Transfer of Advanced Command and Control (C2) Computer-Based Systems.
Quarterly technical rept. 1 Jan-31 Mar 80,
James F. Wittmeyer, III. 31 Mar 80, 52p Rept no. CSM-80-02
Contract MDA903-80-C-2155, ARPA Order-382

C2 computer-based systems design should be informed by design filters, selection of proper terminal and dialogue interfaces, computer-based systems transfer must be informed by logistical considerations and follow-through documentation. (Author)

AD-A084 016/5 PC **A03**/MF **A01**
Magnavox-General Atronics Philadelphia PA
High Power HF and Noise Cancellation System.
Final technical rept. Oct 78-Jan 80,
Samuel J. Harris, and Stephen J. Rosasco. Mar 80, 48p GAC-3392-3403-13, RADC-TR-80-56
Contract F30602-78-C-0338

The objectives of this effort were achieved and should permit high power HF (2-30 MHz) transmitters and conventional HF receivers to be collocated on an aircraft and operated simultaneously (full duplex) with appreciably less than 10% frequency separation between the transmit and receive channels. The option of frequency assignment between the Maximum Usable Frequency (MUF) and the Lowest Usable Frequency (LUF) for the transmit and receive frequencies can result in a 40 dB improvement in a duplex circuit, or stated another way, it may be the only way to establish a circuit between two points. One or more full duplex HF circuits can be operated simultaneously on an aircraft. The technique employed is a high power HF Interference Cancellation System which is adaptive and completely automatic. The significance of this effort is that it has direct application to C3 aircraft and collocated ground HF sites, including those sites with transmitters of ultra high power output (>>1 kW). In addition, the ultra linear high power weight/controller technology employing goniometers can be applied in any frequency range from VLF to UHF. (Author)

N80-22543/6 PC **A10**/MF **A01**
Future Systems, Inc., Gaithersburg, MD.
An Advanced Domestic Satellite Communications System.
Mar 80, 205p NASA-CR-163004, FSI-242
Contract NASW-3300

An updated traffic projection for U.S. domestic satellite communications service covering a period of 15 years; mid-1980 to mid-1995 was prepared. This model takes into account expected technology advances and reductions in transmission costs, legislative and regulatory changes permitting increased competition, and rising energy costs which will encourage more extensive substitution of telecommunications for travel. The historical development and current status of satellite systems are discussed as well as the characteristics of follow-on systems. Orbital arc utilization, spacecraft configuration for single shuttle launch, Earth station configuration, and system costs are examined. Areas which require technology development include multiple beam frequency reuse antennas, on-board switching, intersatellite links, and ka-band operation. Packing and deployment schemes for enclosing the satellite within the shuttle orbiter bay must also be devised.

N80-22545/1 PC **A03**/MF **A01**
McDonnell-Douglas Astronautics Co., St. Louis, MO.
Ultramicrowave Communications System, Phase 2.
Final Report.
5 Jan 80, 33p NASA-CR-160573, MDC-E2209
Contract NAS9-15617

Communications system design was completed and reviewed. Minor changes were made in order to make it more cost effective and to increase design flexibility. System design activities identified the techniques and procedures to generate and monitor high data rate test signals. Differential biphase demodulation is the proposed method for this system. The mockup and packaging designs were performed, and component layout and interconnection constraints were determined, as well as design drawings for dummy parts of the system. The possibility of adding a low cost option to the transceiver system was studied. The communications program has the advantage that new technology signal processing devices can be readily interfaced with the existing radio frequency subsystem to produce a short range radar.

N80-22546/9 PC **A04**/MF **A01**
Communications Research Centre, Ottawa (Ontario). Radio and Radar Research Branch.

The Great Lakes Propagation Measurement Program: Comparisons of the Canadian Data with the Predictions of FCC R-6602.
F. H. Palmer. Feb 80, 67p CRC-1332

It was found that there was insufficient propagation data to determine reliably either the interference levels that would be encountered, or the applicability of the existing FCC R-6602 propagation curves, in the region of the Great Lakes. Accordingly, it was decided to conduct a joint study to assess, and if possible resolve, the propagation issues. Attention is confined to comparisons of observed field strengths in the Great Lakes area with those predicted by R-6602, and to an interpretation of the differences in terms of various paths and systems parameters. It is shown that, while the R-6602 curves accurately predict the long term (annual average) values of F(50,50) and F(50,10), they do not take into account observed diurnal and seasonal variatons of signal strengths of up to about 30 dB. Qualitatively, signal strengths over all paths are found to be higher at night than during the day and higher in summer than in winter. Empirical expressions are presented which relate the signal strengths predicted by R-6602 to those actually observed, and which take into account time of day, day of year, path length, and percentage of propagation path covered by water.

N80-22547/7 PC **A03**/MF **A01**
Western Union Telegraph Co., Upper Saddle River, NJ.
The 18/30 GHz Fixed Communications System Service Demand Assessment. Volume 1: Executive Summary.
T. Gabriszeski, P. Reiner, J. Rogers, and W. Terbo. Jun 79, 32p NASA-CR-159546
Contract NAS3-21359
3.

The total demand for voice, video, and data communications services, and satellite transmission services at the 4/6 GHz, 12/14 GHz, and 18/30 GHz frequencies is discussed. Major study objectives, overall methodology, results, and general observations about a satellite systems market characteristics and trends are summarized.

N80-22548/5 PC **A15**/MF **A01**
Western Union Telegraph Co., Upper Saddle River, NJ.
The 18/30 GHz Fixed Communications System Service Demand Assessment. Volume 2: Main Text.
T. Gabriszeski, P. Reiner, J. Rogers, and W. Terbo. Jun 79, 328p NASA-CR-159547
Contract NAS3-21359
3.

The total demand for communications services, and satellite transmission services at the 4/6 GHz, 12/14 GHz, and 18/30 GHz frequencies is assessed. The services are voice, video, and data services. Traffic demand, by service, is distributed by geographical regions, population density, and distance between serving points. Further distribution of traffic is made among four major end user groups: business, government, institutions and private individuals. A traffic demand analysis is performed on a typical metropolitan city to examine service distribution trends. The projected cost of C and Ku band satellite systems are compared on an individual service basis to projected terrestrial rates. Separation of traffic between transmission systems, including 18/30 GHz systems, is based on cost, user, and technical considerations.

N80-22549/3 PC **A09**/MF **A01**
Western Union Telegraph Co., Upper Saddle River, NJ.
The 30/20 GHz Fixed Communications Systems Service Demand Assessment. Volume 3: Appendices.
T. Gabriszeski, P. Reiner, J. Rogers, and W. Terbo. Jun 79, 200p NASA-CR-159548
Contract NAS3-21359

The market analysis of voice, video, and data 18/30 GHz communications systems services and satellite transmission services is discussed. Detail calculations, computer displays of traffic, survey questionnaires, and detailed service forecasts are presented.

N80-22572/5 PC **A03**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
An Automated HF Signal Measurement System.
J. E. Pesterfield. 1979, 31p RAD-NAV-65, RAE-TR-78132

An HF Measurement System at Cobbett Hill Radio Station is described. Measurements of signal strength and error rates of test transmissions made automatically under the control of a PDP8F digital computer are presented. The data are stored and subsequently analyzed to obtain, signal-to-noise, bit error temporal distribution, and fading morphology. Future expansion of the system is discussed and it is concluded that a large reduction in the workload of station operators and test staff can be realized.

N80-22780/4 PC **A06**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
Solar Power Satellite (SPS) Fiber Optic Link Assessment.
Final Report.
31 Jan 80, 102p NASA-CR-160575, D180-25888-1
Contract NAS9-15636

A feasibility demonstration of a 980 MHz fiber optic link for the Solar Power Satellite (SPS) phase reference distribution system was accomplished. A dual fiber-optic link suitable for a phase distribution frequency of 980 MHz was built and tested. The major link components include single mode injection laser diodes, avalanche photodiodes, and multimode high bandwidth fibers. Signal throughput was demonstrated to be stable and of high quality in all cases. For a typical SPS link length of 200 meters, the transmitted phase at 980 MHz varies approximately 2.5 degrees for every deg C of fiber temperature change. This rate is acceptable because of the link length compensation feature of the phase control design.

N80-23047/7 PC **A06**/MF **A01**
European Space Agency, Paris (France).
Link Invariant Line Programs in Communication Systems.
F. J. Buchberger. Mar 79, 101p ESA-TT-501-REV, DLR-FB-77-38
Transl. Into English of "Anschlussinvariante Leitungsprogramme in Kommunikationssystemen", Rept. Dlr-FB-77-38 Dfvlr, Oberpfaffenhofen, (Germany, F.R.), Feb. 1977. Original Report in German Previously Announced as X79-71675.

Starting with the term 'communications system' a general introduction to the field of communications operating systems is given. By two examples, the operational program of the Interface Message Processors (IMPs) and TIPS, (Terminal IMPS) in the ARPA computer network and the operating system SOHO, it is shown in detail how communications operating systems can be constructed. The line programs are the object of particular consideration. The terms 'simple', 'copied', and 'link invariant' line programs are defined, and the advantages and disadvantages of these types of line programs are discussed. The implementation of link invariant line programs in the operating system SOHO is described. Their memory space and computing time requirements are evaluated. The effect of these requirements on the overall system performance is investigated. The investigation shows that link invariant line programs are preferable to copied line programs in most cases.

PAT-APPL-6-101 292 PC **A02**/MF **A01**
Department of the Navy Washington DC
Teletype Loop Switching Matrix.
Patent Application,
Robert R. Hartley, and Joseph A. Konrad. Filed 7 Dec 79, 12p AD-D007 195/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This document discloses a system for interconnecting and switching teletype or digital data signals when transmitted over any of the four universally accepted standard signal loops. The system incorporates a novel triple loop arrangement; and IN loop connected to a signal source, and 'INTERNAL' loop to provide switching and 'OUT' loop connected to the signal destination. Each 'IN' loop or 'OUT' loop together with half of its associated 'INTERNAL' loop is implemented in a single printed circuit card. The system can incorporate any number of 'IN' and 'OUT' loops and the associated 'INTERNAL' loops. (Author)

PB80-177280 PC **A02**/MF **A01**
Federal Communications Commission, Washington, DC. Policy Development Div.
UHF Task Force Final Report: Executive Overview and Summary,
Raymond M. Wilmotte. 15 Jan 80, 14p FCC/PRB/PDD/6
See also PB80-164437.

The UHF Task Force was established by the Federal Communications Commission on October 1976 to report on the increasing demand from a variety of services for space in the UHF part of the radio spectrum to meet the expected increase in demand. The Task Force focused its attention on procedures and technologies for increasing the efficiency with which the spectrum was being used. It studied specifically television and three major mobile services--maritime, aeronautical and land mobile. Estimates were made of the spectrum required for the operation of viable television stations up to the year 1990. Estimates of the spectrum needs of the civil maritime and aeronautical services were a fraction of those estimated by these industries because the task force took into account the expected and possible improvements in spectrum efficiency. In connection with land mobile, a development contract was granted leading to an amplitude compandored single sideband system requiring a bandwidth of 5 KHz compared with 20-30 KHz of the current frequency modulation system. Consideration was given to using the forces of the marketplace instead of regulation for introducing spectrum saving technologies. In the course of the work special approaches applicable to long range studies were used and developed.

PB80-180722 PC **A10**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Telecommunication.
Michigan State University-Rockford Two-Way Cable Project. Volume III. Minicomputer System Software.
Final rept.,
Martin P. Block, John B. Eulenberg, Eric S. Smith, and Jayne W. Zenaty. Jun 78, 216p NSF/RA-780602
Grant NSF-APR75-14286
See also Volume 1, PB-297 824.

The four-year project in Rockford, Illinois, tested the minicomputer-controlled interactive instruction capability of two-way cable against more traditional learning situations during a 12-lesson course in prefire planning administered to the city's fire department. Included in this volume are the computer program documentation and program listings for all user written software in the project. Modifications made by Michigan State University personnel on the General Automation (GA) SPC-16/65 minicomputer are also described. In addition, all file structures and data blocks necessary for the functioning of the computer system have been included.

PB80-182397 PC **A12**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA.
Optical Communication Systems, Proceedings of the National Science Foundation Grantee-User Meeting on Optical Communication Systems, Held at Pittsburgh, Pennsylvania on June 5-7, 1978,
Milton Gottlieb, Chen Tsai, Gerald Brandt, and Jim Blanchard. 1978, 252p NSF/RA-780717
Sponsored in part by Westinghouse Research and Development Center, Pittsburgh, PA.

Thirty-eight papers describe research developments in the following areas of optical communications: atmospheric optical communication systems, including low visibility channels and laser communication components; atmospheric optical communication systems, including speed and range limitations, diversity receivers, and optical pulse propagation in fog and clouds; detection and filtering, including space and underwater optical communications, and stochastic point processes; and detection and filtering processes. Also pre-

sented is a series of papers on guided-wave optic devices covering such aspects as RF frequency sorting in electronic warfare systems, planar technology for semiconductor optoelectronics, wideband guided-wave devices, blazed dielectric gratings, thin film wave guide calculations, integration of the DBR laser and control of lateral mode in injection lasers, army communication systems, integrated optoelectronic devices using silicon substrates, and single- and multi-mode fiber couples. Another group of papers devoted to optical communication devices treats developments in semiconductors, injection lasers, infrared devices, photoexcitation, fiber links, a computer controlled laser system, a submicron facility, and nonlinear conjugate wave back scatterings.

PB80-810831 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Microwave Communication. April, 1976-May, 1980 (Citations from the NTIS Data Base).
Rept. for Apr 76-May 80,
William E. Reed. Jun 80, 287p
Supersedes NTIS/PS-79/0525 and NTIS/PS-78/0525. See also 1964-March, 1976, NTIS/PS-77/0465.

Research reports pertinent to the techniques, equipment, reliability, and utilization of microwave communications are cited. Studies on microwave relays, links, data transmission, telemetry, satellite communications, multiplexing, and propagation are included. (This updated bibliography contains 280 abstracts, 46 of which are new entries to the previous edition.)

PB80-811136 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Telecommunication: Economic Studies. 1964-1978 (Citations from the NTIS Data Base).
Rept. for 1964-78,
William E. Reed. Jun 80, 287p

Research on economic evaluations of the telecommunications industry is cited. Communication satellites, common carriers, cable television, telephone systems, and television systems are all covered in the bibliography. Economic studies of the foreign telecommunications industry are included. (This updated bibliography contains 280 abstracts, none of which are new entries to the previous edition.)

PB80-811144 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Telecommunication: Economic Studies. 1979-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1979-May 80,
William E. Reed. Jun 80, 67p
Supersedes NTIS/PS-79/0603 and NTIS/PS-78/0581. See also 1964-1978, PB80-811136.

Research on economic evaluations of the telecommunications industry is cited. Communication satellites, common carriers, cable television, telephone systems, and television systems are all covered in the bibliography. Economic studies of the foreign telecommunications industry are included. (This updated bibliography contains 60 abstracts, 36 of which are new entries to the previous edition.)

17C. Direction Finding

AD-A083 959/7 PC **A02**/MF **A01**
Defence Research Establishment Ottawa (Ontario)
A Signal Delay Unit for TOA Direction-Finding Evaluation.
Technical note,
Robert J. Inkol. Feb 80, 25p Rept no. DREO-TN-80-5
Abstract in French.

A Signal Delay Unit (SDU) was developed to provide differentially delayed baseband signals for laboratory evaluation of an experimental Time of Arrival (TOA) direction-finding system. The SDU is a completely self-contained unit employing a tapped Bucket Brigade (BBD) delay line to realize up to four independent differential signal delays of from one to 256 microseconds. (Author)

AD-A084 009/0 PC **A09**/MF **A01**
Naval Postgraduate School Monterey CA
Arithmetic Architecture for Surface/Subsurface Bearing - Only Radar Tracking by Microcomputer.
Master's thesis,
Fatih Erdogdu. Dec 79, 178p

Passive localization and tracking techniques are of interest in a variety of microcomputer based surface/subsurface radar applications. Because a significant portion of the cost of building or maintaining a warship is the electronics in its sensor and weapon system, and because a great amount of time and manpower is employed in performing simple but important tasks, microcomputers offer the potential to: (1) Reduce the cost of digital systems, (2) Perform some complex functions at remote stations, relieving the congestion at larger central computer facilities, and (3) Perform functions currently handled by watch personnel, thus reducing the manning requirements of watch sections. An example of this is the problem of manual tracking of radar contacts and the solution of Maneuvering Board Problems. It is the purpose of this study to demonstrate than an alternate approach to the solution of the problems mentioned above can be developed and implemented by using a microcomputer system, while at the same time maintaining a human engineered user interface. (Author)

17D. Electromagnetic and Acoustic Countermeasures

AD-A083 784/9 PC **A09**/MF **A01**
Quest Research Corp McLean VA
Handbook for the Integration of Countermeasure/Counter-Countermeasure Considerations into the Materiel Development/Acquisition Life Cycle,
G. B. Murray, J. R. Bobbitt, III , James W. Carman, Robert F. C. Winger, and W. Karl Van Newkirk. Mar 80, 192p C-3649, CM/CCM-HB-80-1
Grant DAAG54-78-G-0305

The basic purpose of this handbook is to provide a roadmap through the US Army material acquisition process, emphasizing the actions necessary to ensure that countermeasure and counter-countermeasure considerations are properly integrated into that process. The methodology by which the CM and CCM aspects of a given concept or system may be examined is developed. The interaction of threat information and system/concept requirements development is discussed, and a method for improving the process is suggested. A matrix correlates the organizations and agencies that play a CM/CCM role with the specific events in which those roles are included. Each event-related role is discussed in detail. How product improvement may be used to integrate CCM into an item and the methodology by which this is done is discussed. An example of CM/CCM methodology actually in use is included. (Author)

AD-A084 013/2 PC **A06**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Feedback Nulling Demonstration System Hardware.
Technical note,
David A. Siegel, David M. Hodsdon, Bing M. Potts, Howard S. Babbitt, and Ervin S. Davis. 23 Nov 79, 108p TN-1979-12, ESD-TR-79-272
Contract F19628-80-C-0002

As part of the technology development of anti-jam satellite communications, Lincoln Laboratory has developed, built, and tested a demonstration analog-feedback adaptive-nulling antenna system. The system, which is based on the Howells-Applebaum feedback loop, is designed to increase the signal-to-interference ratio when desired signals operate in the presence of interference signals. The signals received from interfering or undesirable signal sources are minimized by appropriately modifying the antenna radiation pattern so as to attenuate signals from the direction of those sources relative to the desired signals. The demonstration system consists of a simulated array of antenna elements and uplink signals and a real-time adaptive receiver-processor which controls the weighting of each element signal prior to combining. The weighting process involves changing the relative amplitudes and phases of the received signals thus changing the effective receiving radiation pattern of the antenna, i.e., its relative response to signals arriving from different directions. The system operation involves taking the signals from N independent antenna elements and weighting and combining them to form a single output signal in which the signal-to-interference ratio is enhanced over what it is for any individual antenna element. The task of the nulling processor is to select the set of weights for the antenna element array in some optimum fashion.

17E. Infrared and Ultraviolet Detection

AD-A083 949/8 PC **A06**/MF **A01**
Air Force Aerospace Medical Research Lab Wright-Patterson AFB OH
Sensor-Aided Target Acquisition Simulation Studies.
Technical rept.,
Gilbert G. Kuperman. Jan 80, 109p Rept no. AMRL-TR-79-118

A Target Acquisition Library was established to organize and facilitate accession of a large number of presented papers, journal articles, and technical reports dealing with all aspects of visual and mediated target acquisition. This report is the first in a planned series of special interest reviews of this literature. It is a survey of material describing sensor-aided target acquisition simulation (i.e., laboratory) studies (excluding radar, which will be treated separately). The introduction discusses the unique problems and applications of mediated target acquisition and its role in our military defense system. A brief description of the library itself and of the criteria for selecting the included studies is also provided as background. (Author)

17F. Magnetic Detection

PAT-APPL-6-117 708 PC **A02**/MF **A01**
Department of the Navy Washington DC
An Improved Self-Powered Vehicle Detection System.
Patent Application,
John F. Scarzello, Daniel S. Lenko, Albert D. Krall, Wayne R. Grine, and Robert E. Brown.
Filed 1 Feb 80, 24p AD-D007 175/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An improved self-powered vehicle detector (SPVD) uses a two-axis magnetometer in conjunction with digital nulling loops to sense a vehicle's magnetic signature and then telemeter vehicle presence information to a roadside receiver. The SPVD system includes a tone code transmitter and an omnidirectional microstrip antenna to simplify installation and maintenance of the SPVD. (Author)

17G. Navigation and Guidance

AD-A083 718/7 PC **A04**/MF **A01**
National Aviation Facilities Experimental Center Atlantic City NJ
ATARS/ATC Simulation Tests with Site Adaptation Logic in the Philadelphia Terminal Area.
Final rept. May-Oct 78,
Gary W. Morfitt, Sidney B. Rossiter, James R. Windle, Arthur W. Fillius, and Thomas A. Choyce. Mar 80, 70p FAA-NA-79-33, FAA-RD-79-116

The purpose of this project was to provide further evaluation and refinement of the Automatic Traffic Advisory and Resolution Service (ATARS) concept. The tests were conducted at the National Aviation Facilities Experimental Center (NAFEC) at Atlantic City, New Jersey, using the Air Traffic Control Simulation Facility (ATCSF). Test results indicated that ATARS had no significant impact on the controllers or control procedures in a Philadelphia Terminal Control Area (TCA) environment. Outside the immediate TCA, where the majority of encounters occurred, the factors contributing to the generation of alarms were, in general, satellite operations and the use of Visual Flight Rules (VFR)

separation criteria. The incidence of positive resolution advisories was low, averaging only 0.5 encounters per hour. Recommendations are to reduce the size of the ATARS desensitization zone at the Philadelphia main airport to approximately 2.0 nautical miles (nmi) from runway thresholds, to incorporate a convergence/divergence detection filter into the ATARS algorithm, and to investigate the possibility of reducing tracker lag by improving turn and level off detection. (Author)

AD-A083 886/2 PC **A04**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Dynamics of a Liquid-Filled Gyroscope: Update of Theory and Experiment.
Final rept.,
Richard D. Whiting, and Nathan Gerber. Mar 80, 52p ARBRL-TR-02221, AD-E430 411

New comparisons are made between the theory of Stewartson, as modified by Wedsmeyer, and existing experimental measurements of the motion of liquid-filled gyroscopes. Errors in previous comparisons are pointed out and corrected, as are some errors in several published presentations of the theory. Because some key parameters were not recorded during the experiments, complete comparisons of theoretical predictions with observed behavior cannot be made. The limited comparisons which can be made show that predicted and measured frequencies of greatest instability of the motion agree to within the experimental error; the growth rates of these frequencies agree to within 10% for Reynolds number greater than 10 to the 4th power, and to within 25% for the lower Reynolds number.

AD-A083 897/9 PC **A08**/MF **A01**
ARINC Research Corp Annapolis MD
An Evaluation of Aircraft Separation Assurance Concepts Using Airline Flight Simulators. Volume II. Appendixes.
Final rept.,
Bruce Morgenstern, and Thomas P. Berry. Nov 79, 171p 1343-01-3-2058-VOL-2, FAA/RD-79-124-2
Contract DOT-FA78WA-4091
See also Volume 1, AD-A083 986.

This report supplements the main study report of a cockpit evaluation of ASA concepts. It contains a description of the flight scenarios used, a copy of the pilot advance briefing and pre-briefing copies of the flight crew questionnaire and supplemental questionnaire with all comments, data analysis formulas, and test bed description details. (Author)

AD-A083 947/2 PC **A02**/MF **A01**
Royal Signals and Radar Establishment Malvern (England)
Precision Navigation for Air Traffic Management,
S. Ratcliffe. Oct 79, 9p RSRE-MEMO-3220, DRIC-BR-72506
Presented at the AGARD GCP Symposium (29th) on Oct 79, at Copenhagen (Denmark).

This report discusses the problems that would arise if airspace users had the use of NAVSTAR or some other much better position-fixing aid than at present, and the uses that ATC could, or could not, make of this capability. There would be formidable transitional problems in the vertical plane, because NAVSTAR measures height from the Earth's centre whereas current altimeters measure atmosphere pressure. In either vertical or horizontal planes much work will be necessary to prove that the separation standards can be reduced at all. The paper discusses changes that might be possible in the ATC system should appreciable reductions in separation standards prove possible. NAVSTAR might form the basis of a collision avoidance system based on either the broadcast co-ordinates of each aircraft or on a time-frequency basis using NAVSTAR as the time reference. The latter scheme would offer protection of a fully-equipped aircraft against a threat that could not afford the expense of a NAVSTAR fit. This paper is a contribution to the 29th AGARD GCP Symposium, Copenhagen, Oct 1979. It is issued as a memo to make it available earlier and in an unclassified document. (Author)

AD-A083 968/8 PC **A03**/MF **A01**
Charles Stark Draper Lab Inc Cambridge MA
Materials Research for Advanced Inertial Instrumentation. Task 3. Rare Earth Magnetic Material Technology as Related to Gyro Torquers and Motors.
Technical rept. no. 2, 1 Jul 78-30 Sep 79,
D. Das, K. Kumar, and E. Wettstein. Oct 79, 50p Rept no. R-1306
Contract N00014-77-C-0388
See also report dated Jul 78, AD-A058 690.

For inertial applications, high-energy-product SmCo5 magnets are required which possess very low flux decay rate, near zero temperature coefficient of magnetization, and thermal expansion coefficient similar to that of beryllium. Concentrated effort has been directed towards achieving and understanding the underlying mechanism of high flux stability. In the ensuing period, efforts will be directed towards temperature compensation and tailoring of thermal expansion along with further studies on stability. (Author)

AD-A084 036/3 PC **A16**/MF **A01**
Aeronautical Systems Div Wright-Patterson AFB OH Common Avionics Div
Characteristic for a Moderate Accuracy Inertial Navigation System (INS).
Technical exhibit.
24 Aug 79, 359p Rept no. ASD/ENAC-77-1-REV-2
Supersedes Rept. no. ASD/ENAC-77-1, Revision 1 and Amendments 1, 2, and 3.

This specification establishes the requirements in terms of form, fit and function (including performance) for an inertial navigation system applicable to a broad spectrum of vehicles. It is the intent of this specification to define the INS requirements to a sufficient extent to allow multiple contractor designed and produced hardware to be used interchangeably at the LRU level in any given vehicle.

AD-A084 037/1 PC **A07**/MF **A01**
Eaton Corp Deer Park NY AIL Div
Simulation of Precision Aircraft Positioning System Utilizing Triangulation, DME and Inertial Smoothing Techniques.
Final rept.,
A. Charych. Mar 78, 142p
Contract N00123-76-C-1322

The purpose of this simulation is to determine the accuracy performance capability of an aircraft positioning system based on the triangulation principle when combined with distance measuring equipment (DME), inertial elements and filtering (blending) of data from the various sensors. The simulation also determines how sensitive the overall system accuracy is to changes in certain key sensor parameters. (Author)

AD-A084 039/7 PC **A10**/MF **A01**
Systems Control Inc (VT) Palo Alto CA
West Coast LORAN-C Flight Test.
Final rept. on Task 13,
Thomas E. Scalise, Eric H. Bolz, and Edwin D. McConkey. Mar 80, 211p FAA-RD-80-28
Contract DOT-FA75WA-3662

A flight test program was flown within the coverage area of the West Coast Loran-C chain during June and July 1979. The purpose of the test was to add to the growing statistical data base that will be used to assess Loran-C as a supplement to, or replacement for, the present VOR/DME navigation system. The test objectives were to: (1) Evaluate the West Coast Loran-C chain by quantifying navigation and position errors within its coverage area; (2) Test Loran-C as a non-precision approach aid in mountainous conditions, using a commercially available Loran-C receiver/navigator, in this case a Teledyne TDL-711; (3) Record the effects of bias shifts and station outages on overall accuracy and approach procedures, especially near a baseline extension; (4) Calculate the absolute flight technical error (FTE) during Loran-C approaches using a typical general aviation aircraft. The main conclusions of the test were: The West Coast Loran-C chain appears stable and dependable. Time difference errors were consistent and related to signal propagation differences over land and over water; TDL-711 was found to be easy to operate, giving stable and repeatable course guidance, although susceptible to random loss of track, a problem which may be software related. The system did not accurately calculate cross track deviation and distance to waypoint. Without needed hardware, software, and/or procedural changes, Loran-C may not meet the RNAV non-precision approach requirements of AC 90-45A.

AD-A084 044/7 PC **A02**/MF **A01**
AMAF Industries Inc Columbia MD
Feasibility of Offset Carrier Systems for Air Traffic Control.
Interim rept. no. 2 for period ending Sep 79,
J. David Claiborne. Oct 79, 17p FAA-RD-79-106
Contract DOT-FA78WAI-830

A brief description of FAA trials of offset carriers systems and multiple outlet systems is given. Short descriptions are also given of existing offset carrier systems in Great Britain and the ARINC system in the United States. The communication deficiencies that could be remedied by an offset carrier system are listed. A short discussion is given concerning the system design deficiencies inherent with an offset carrier system. No conclusions are made concerning the usefulness or practicality of an offset carrier system. (Author)

AD-A084 045/4 PC **A09**/MF **A01**
Transportation Systems Center Cambridge MA
Analysis of Expandability and Modifiability of Computer Configuration Concepts for ATC. Volume I. Distributed Concept.
Final rept.,
David F. Clapp, Joseph B. Hagopian, and Ronald M. Rutledge. Nov 79, 197p TSC-FAA-79-31, FAA-EM-79-22-VOL-1

The questions of expandability and modifiability of a 1990-era Air Traffic Control (ATC) system are addressed. Two strawman systems are described at the functional level: a Baseline System, which represents the ATC system as it might be just after the replacement of the current National Airspace System (NAS) en route computers, and a Future System, which represents what might be derived ten years later under an appropriate scenario for ATC development. A distributed processing computer configuration is postulated for the Baseline System, and processing and communications loads are calculated on the basis of traffic and parameter estimates for 1985. Expansion and modification of the Baseline System to produce the Future System designed to meet estimated 1995 loads under the supplied scenario are examined. The distributed processing concept, as considered here, was deemed generally suitable for use in the ATC system of the future.

AD-A084 072/8 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
The Inertial Navigation System,
Ren Sicong. 14 Apr 80, 4p Rept no. FTD-ID(RS)T-0280-80
Edited trans. of Hang K'ung Chih Shih (China) n9 p26 Sep 79, by H. P. Lee.

No abstract available.

N80-22296/1 PC **A04**/MF **A01**
Texas Univ. at Austin. Dept. of Aerospace Engineering and Engineering Mechanics.
A Study of Autonomous Satellite Navigation Methods Using the Global Positioning Satellite System.
Final Report.
B. D. Tapley. 20 Apr 80, 55p NASA-CR-162635
Grant NSG-5154

Special orbit determination algorithms were developed to accomodate the size and speed limitations of on-board computer systems of the NAVSTAR Global Positioning System. The algorithms use square root sequential filtering methods. A new method for the time update of the square root covariance matrix was also developed. In addition, the time update method was compared with another square root convariance propagation method to determine relative performance characteristics. Comparisions were based on the results of computer simulations of the LANDSAT-D satellite processing pseudo range and pseudo rangerate measurements from the phase one GPS. A summary of the comparison results is presented.

N80-22297/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
A New Algorithm for Horizontal Capture Trajectories.
J. D. McLean. Mar 80, 21p NASA-TM-81186, A-8111

An algorithm which transfers an aircraft from an initial position and heading to a final position and heading was developed for onboard synthesis of horizontal flight paths. The algorithm finds all solutions possible, and selects the one with minimum path length. Degenerate conditions in which one or more of the basic segments is missing are handled without difficulty. The solution to this problem is derived, and a FORTRAN listing of the algorithm is provided.

N80-22303/5 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Flight Div.
Comparison of the MINILIF Location System and the NLR Inertia Measuring System Stalins.
A. J. L. Willekens. 28 Jun 78, 17p NLR-MP-78026-U

Aircraft trajectories were determined using the optical location system (MINILIR) and the inertial measuring system (STALINS). The optical tracking was controlled with a movie camera mounted on the MINILIR tracker. A known position in flight was obtained with a high precision fan marker system RASP. The accuracy of the position and velocity data obtained using both systems is discussed.

PB80-184757 PC **A03**/MF **A01**
National Ocean Survey, Rockville, MD. Coastal Mapping Div.
Formulas for Positioning at Sea by Circular, Hyperbolic, and Astronomic Methods,
James Collins. Feb 80, 36p NOAA-TR-NOS-81, NOAA-80040101

Today's positioning of a vessel is accomplished by using either hyperbolic (LORAN), circular (Raydist), celestial, or satellite navigation systems. The use of these systems with onboard computers often has created problems for the navigator and computer programer who is faced with a variety of formulas for computing ships' positions. This report is an attempt to clarify and simplify the formulas and procedures required to correctly compute the position of a vessel on the high seas.

PB80-810880 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Loran C Navigation. 1964-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-May 80,
William E. Reed. Jun 80, 173p
Supersedes NTIS/PS-79/0523 and NTIS/PS-78/0531. For the companion Published Search of the Engineering Index Data Base, see PB80-810898.

Research reports are cited on the use of Loran C for air and maritime navigation, including coastal confluence and inland waters; automatic vehicle location and tracking; distress systems; portable land position finding; meteorological and atmospheric data acquisition; time and frequency synchronization; and position fixing. Also included are research on Loran C equipment and signal propagation. (This updated bibliography contains 166 abstracts, 22 of which are new entries to the previous edition.)

PB80-810898 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Loran C Navigation. 1970-May, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-May 80,
William E. Reed. Jun 80, 140p
Supersedes NTIS/PS-79/0524 and NTIS/PS-78/0532. For the companion Published Search of the NTIS Data Base, see PB80-810880.

Research reports are cited on the use of Loran C for air and maritime navigation, including coastal confluence and inland waters; automatic vehicle locating and tracking; meteorological and atmospheric data acquisition; position fixing, and time and frequency synchronization. Also included are research on Loran C equipment and signal propagation. (This updated bibliography contains 133 abstracts, 9 of which are new entries to the previous edition.)

17H. Optical Detection

AD-A083 640/3 PC **A05**/MF **A01**
Honeywell Systems and Research Center Minneapolis MN
Advanced Target Tracker Concepts.
Quarterly progress rept. no. 1, 28 Sep-28 Dec 79,
P. M. Narendra, and B. L. Westover. Jan 80, 77p Rept no. 80SRC6
Contract DAAK70-79-C-0150

Conventional target tracking approaches rely on numerical correlation over successive frames on a window around the target. They are therefore sensitive to partial obscuration and changes in target and background appearances. Furthermore, multiple-target tracking requires replication of the hardware. The development of a multiple-target tracking approach based on a dynamic scene model is derived from the analysis of a time sequence of imagery. Simulation results demonstrate multiple-target tracking in cluttered backgrounds and in imagery from fast-moving platforms. The approach can be implemented as an integral part of the Honeywell target screener system. Tracking targets in video from TV and FLIR sensors is essential for fire control in weapon systems using electro-optical target acquisition. Typical Army applications are shown: a remotely piloted vehicle (RPV); an advanced attack helicopter (AAH); and a combat vehicle (CV). Target tracking in these applications yields the target position for accurate pointing of a laser designator for a smart munition, such as Hellfire and Copperhead, or for fire control of conventional weapons.

AD-A084 043/9 PC **A18**/MF **A01**
Army Engineer Topographic Labs Fort Belvoir VA
U. S. Army Corps of Engineers Remote Sensing Symposium, 29 - 31 October 1979 Held at Sheraton International Conference Center, Reston, Virginia.
31 Oct 79, 424p

Contents: Data Collection, Passive and Active Sensors; Photogrammetry, Photo Interpretation and Image Data Processing; Acquisition; A View from Space; and User Assistance.

N80-22570/9 PC **A02**/MF **A01**
Research Inst. of National Defence, Stockholm (Sweden).
Differential Absorption Lidar: Effects of Speckle Noise.
K. Oestberg. 1979, 12p FOA-B-30031-E1, ISBN-91-7056-052-8

The difference between direct detection and heterodyne detection with regard to speckle noise is demonstrated. The sensitivity imposed by the speckle noise on a range-resolving differential absorption lidar with heterodyne detection is shown. A formula for the standard deviation of estimated gas concentration is derived.

17I. Radar Detection

AD-A083 680/9 PC **E19**/MF **E19**
Catholic Univ of America Washington DC Dept of Physics
Resonances of Radar Targets and Target Discrimination.
Final rept. 6 Mar 79-5 Mar 80,
Herbert Uberall. Mar 80, 44p
Contract N00019-79-C-0270

The topic of the research program covers methods for target discrimination by radar scattering, making use of the natural resonances of the targets. The general plan of the program consists in a study of resonances of targets of simple shape (e.g., sphere) but complex composition (e.g., dielectric coating of conductors) during the first year, followed by simple conducting targets and comparison with parallel measurements performed at NSWC Dahlgren in the second year, with further extension to conductors of more complex shapes, using Waterman's methods, later on. The emphasis of our study is two-fold, namely: (1) to study ways how the resonance structure of the radar echo can be used for identifying the nature of the target (the 'inverse scattering problem'); and (2) to obtain a physical understanding of the phenomena that cause the resonances, and how they manifest themselves in both steady-state and pulsed echoes. Such an understanding, in preference to a more mechanical use of the singularity expansion method, will provide us with the true capability of mastering the target discrimination problem.

AD-A083 837/5 PC **A05**/MF **A01**
Naval Postgraduate School Monterey CA
Clutter Suppression in Radars by an Application of Digital Filters to MTI Systems.
Master's thesis,
John Elias Sarris. Dec 79, 82p

A significant part of radar technology has been concerned with developing techniques which permit satisfactory operation of radar systems when moving targets are in the presence of relatively fixed targets (clutter). This thesis presents the significant aspects of old, improved and modern anticlutter techniques, each of which is described with its principal advantages and disadvantages. A tabulation is made which compares each anticlutter technique on the basis of its clutter suppression capability. Continuing, an application of digital filters is made by designing a fourth-order recursive filter with Butterworth characteristics, using a computer program. This filter can be used in a range-gated MTI (Moving Target Indication) receiver to improve its performance. Special consideration was given to the AN/UPS-1 and AN/SPS-40B,C radars which are used in the Greek Navy in a clutter environment characteristic of the Mediterranean Sea. Appropriate modifications to their existing analog systems are suggested. (Author)

AD-A083 863/1 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Severe 5 CM Radar Attenuation of the Wichita Falls Storm by Intervening Precipitation,
Robert H. Allen, Donald W. Burgess, and Ralph J. Donaldson, Jr. 1980, 5p Rept no. AFGL-TR-80-0135
Pub. in Conference on Radar Meteorology (19th), held in Miami, FL. 15-18 Apr 80, p87-89 1980.

No abstract available.

AD-A083 865/6 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
On the Automation of Weather Radar Information for Air and Ground Operations,
Kenneth M. Glover. 1980, 9p Rept no. AFGL-TR-80-0138
Pub. in Conference on Radar Meteorology (19th) p118-124, 15-18 Apr 80. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

No abstract available.

AD-A083 866/4 PC **A02**/MF **A01**
Air Force Geophysics Lab Hanscom AFB MA
Gust Front Structure Observed by Doppler Radar,
Ralph J. Donaldson, Jr., and Carlton L. Bjerkaas. 1980, 7p Rept no. AFGL-TR-80-0137
Pub. in Conference on Radar Meteorology, n19 p157-161 15-18 Apr 80. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

No abstract available.

AD-A083 922/5 PC **A03**/MF **A01**
Army Engineer Topographic Labs Fort Belvoir VA
Backscattering of Electromagnetic Waves from a Layer of Vegetation,
Richard A. Hevenor. 15 Feb 80, 29p Rept no. ETL-R008

A theoretical model for the backscattering of elelctromagnetic waves from a layer of vegetation is computed using a first order renormalization technique to determine volume scattering. The vegetation soil interface is assumed rough according to the tangent plane approximation and the scattering from this boundary is added incoherently to the

volume scattering result. The mean wave in the vegetation is obtained using a bilocal approximation of the Dyson's equation. A free space dyadic Green's function is used along with a correlation function of the dielectric fluctuations which is exponential in form and which also possess different correlation lengths lx, ly, and lz in the x, y, and z, directions. Effective propagation constants are obtained for both horizontal and vertical polarizations. The scattered wave is solved for using a two-dimensional Fourier transform technique and the boundary conditions at either end of the vegetation layer are matched. The far field backscatter coefficients are computed for both horizontal and vertical polarizations. The mean and variance of the dielectric fluctuations are calculated with the aid of Peake's model for the dielectric constant of vegetation. The theory is matched to experimental data taken from a corn field. The resulting values for the correlation parameters are then used to monitor the growth pattern of the corn field over a period of time. Comparison between the theoretical and experimental results over this time period are shown. The theory is also matched to experimental data from spring and fall deciduous trees.

AD-A084 015/7 PC **A03**/MF **A01**
National Aviation Facilities Experimental Center Atlantic City NJ
Flight Evaluation of a Radar Cursor Technique as an Aid to Airborne Radar Approaches.
Interim rept. Jul-Aug 79,
J. Perez. Mar 80, 38p FAA-NA-80-8, FAA-RD-80-18

This report presents preliminary results of a flight test evaluation of a radar cursor technique to be used as an aid in acquiring and tracking the desired ground track during airborne radar approaches. The test was performed using a Sikorsky CH-53A helicopter on loan from NASA and based at NAFEC. The airborne radar system used was a BENDIX RDR-1400A modified to electronically produce a radar cursor display of course error. Airborne radar approaches were made to an offshore and an airport test environment located within a 60 nautical mile radius of NAFEC. Systems Control, Inc. (SCI), provided contractor services in the areas of test planning, data reduction, and final report preparation. The specific purpose of the test was to evaluate the practical utility of the radar cursor as an aid to performing airborne radar approaches. The preliminary conclusion of this test was that the use of the radar cursor improved course acquisition and ground tracking significantly with pilotage errors and total system cross-track errors reduced by one-half or better. The radar cursor technique showed potential in reducing airspace requirements for airborne radar approaches. SCI is presently completing data reduction and analysis and will publish a final report in the near future. (Author)

N80-22575/8 PC **A04**/MF **A01**
Physics Lab. RVO-TNO, The Hague (Netherlands).
Remote Sensing of the Sea by Radar. Analysis of Available Data and Results of Noordwijk, 1977.
G. P. Deloor. Dec 78, 58p PHL-1978-53, TDCK-71720

A survey of results from radar observations of the sea is presented. Radar measurements conducted in the Netherlands are analyzed and compared with other radar observations. Results of project Noordwijk 77 are discussed in relation to the measurements.

N80-22576/6 PC **A02**/MF **A01**
Physics Lab. RVO-TNO, The Hague (Netherlands).
On the Performance of a Simplified MTI Canceller Selection Rule for FUCAS.
H. F. A. Roefs. Mar 79, 24p PHL-1979-13, TDCK-71965

A rainclutter suppression system implemented into the experimental phased array pulse radar system FUCAS is described. The optimal selection rule (under the assumption of a Rayleigh target) is derived and, since the actual realization of this rule would be too costly, a simplified selection mechanism based solely on the clutter suppression capabilities of the cancellers is introduced and its expected performance compared with the optimal rule.

N80-22662/4 PC **A03**/MF **A01**
Applied Science Associates, Inc., Apex, NC.
Radar Altimeter Mean Return Wave Forms from Near-Normal-Incidence Ocean Surface Scattering.
Final Report.
G. S. Hayne. Apr 80, 27p NASA-CR-156864
Contract NAS6-2810

For a nearly Gaussian transmitted pulse shape scattered from a nearly Gaussian distributed sea surface, a small argument series expansion of one term lead to a several term power series expression for the mean return waveform. Specific expressions are given for the first four terms. These results, which require less computer time than numerical convolution, are useful for data analysis from current or past radar altimeters and for design studies of future systems. Several representative results are presented for an idealized Seasat-1 radar altimeter.

17J. Seismic Detection

AD-A083 950/6 PC **A06**/MF **A01**
Sierra Geophysics Inc Arcadia CA
Seismic Amplitude and Waveform Research.
Final rept.,
Robert S. Hart, David M. Hadley, G. R. Mellman, and Rhett Butler. 25 Oct 79, 103p Rept no. SGI-R-79-012
Contract F08606-79-C-0009, ARPA Order-2551
See also rept. nos. SGI-R-79-002, AD-A072 433 and SGI-R-79-003, AD-A080 124.

This technical report summarizes the research done in a 12 month program directed toward understanding observed m sub b and yield biases at the Nevada Test Site. This program has necessarily included work on seismic source functions, variations in attenuation, frequency dependence of Q, regional amplitude and waveform variations, and shallow structural influences on seismic wave propagation. The report is divided into six sections, each describing an individual research effort on one or more of these issues. (1) Seismic Source Functions and Attenuation from Observations of Pahute Mesa Events; (2) Observational Studies of the Piledriver and Hard Hat Tests; (3) Frequency Dependence of Seismic Attenuation: A Mechanism to Unite Amplitude and Spectral Ratio Techniques; (4) Estimation of Receiver Functions for Stations Located at the NTS; (5) Studies of Outgoing Seismic Energy from Yucca Flats, NTS; and (6) Amplitude Studies of the Stations OB2, RKON and HNME Relative to the WWSSN Mean.

18. NUCLEAR SCIENCES AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

AERE-R-8923 MF **A01**
UKAEA, Harwell (England). Atomic Energy Research Establishment.
Effects of Radiation on Electrical Insulators in Fusion Reactors.
D. C. Phillips. Jun 78, 54p
U.S. Sales Only. Microfiche copies only.

The effects of radiation on organic polymers and ceramics are reviewed with particular reference to the possible uses of these materials as electrical insulators in fusion reactors. (Atomindex citation 09:417244)

BARC-999 MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Laser Induced Fusion - Theoretical Aspects.
S. V. Lawande, and M. R. Gunye. 1979, 185p
U.S. Sales Only. Microfiche copies only.

The theoretical aspects of thermonuclear fusion induced by laser are discussed. After outlining the basic features and the energetics of laser fusion in the chapter 1, various non-linear mechanisms responsible for an enhanced absorption of laser energy into the plasma and the stimulated scattering processes which hinder the absorption are discussed in the second chapter on laser plasma interactions. The third chapter on gas dynamics and the shock phenomena presents the mathematical formulation of the compression to high densities of the core of the pellet for its implosion. A hydrodynamic model developed to stimulate the evolution of laser heated symmetric plasma is outlined in the chapter four on numerichigly relativistic noninteracting particles, regular bouncing states may occur at high densities, or at high temperatures. The latter case is considered in details for the collapse phase of a hot universe; lepton pair creation may completely decelerate the collapse of a hot hadronic plasma, provided the observational parameters, the Hubble constant Hsub(deg), the matter parameter omega sub(deg) and the deceleration parameter qsub(deg) satisfy certain constraint conditions. (Atomindex citation 10:481204)

BNL-27118 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Hyper Fuse: A Novel Inertial Confinement System Utilizing Hypervelocity Projectiles for Fusion Energy Production and Fission Waste Transmutation.
H. Makowitz, J. R. Powell, and R. Wiswall. 1979, 16p CONF-791204-22
Contract EY-76-C-02-0016
Miami international conference on alternative energy sources, Miami Beach, FL, USA, 10 Dec 1979.

Parametric system studies of an inertial confinement fusion (ICF) reactor system to transmute fission products from an LWR economy have been carried out. The ICF reactors would produce net power in addition to transmuting fission products. The particular ICF concept examined is an impact fusion approach termed HYPERFUSE, in which hypervelocity pellets, traveling on the order of 100 to 300 km/sec, collide with a target in a reactor chamber and initiate a thermonuclear reaction. The DT fusion fuel is contained in a shell of the material to be transmuted, e.g., exp 137 Cs or exp 90 Sr. The 14 MeV fusion neutrons released during the pellet burn cause transmutation reactions (e.g., (n, 2n), (n, alpha), etc.) that convert the long lived fission products (FP's) either to stable products or to species that decay with a short half-life to a stable product. (ERA citation 05:017252)

CLM-R-191 PC **A02**/MF **A01**
UKAEA Culham Lab., Abingdon (England).
Transport Calculations for a High Density Ohmically Heated D-T Tokamak.
J. J. Field, and E. Minardi. Nov 78, 14p
U.S. Sales Only.

The results of transport calculations are presented for a high current and particle density Tokamak, like Ignitor. The transport equations used are averaged over prescribed temperature and density profiles, with an assumed electron energy confinement time given by Alcator scaling and an ion energy confinement time slightly worse than neoclassical. The trapping, slowing down, etc., of alpha particles is included on the basis of classical theory. The results indicate that with realisable technological parameters ignition is unlikely to be achieved without the use of additional heating, even for a Z eff = 1 plasma. (Atomindex citation 10:489155)

CONF-791204-23 PC **A02**/MF **A01**
Argonne National Lab., IL.
Starfire: A Commercial Tokamak Reactor.
C. C. Baker, M. A. DeFreece, D. A. Abdou, C. A. Trachsel, D. Graumann, and J. Kokoszenski. 1979, 13p
Contract W-31-109-ENG-38
Miami international conference on alternative energy sources, Miami Beach, FL, USA, 10 Dec 1979.

The basic objective of the STARFIRE Project is to develop a design concept for a commercial tokamak fusion electric power plant based on the deuterium/tritium/lithium fuel cycle. The key technical objective is to develop the best embodiment of the tokamak as a power reactor consistent with credible engineering solutions to design problems. Another key goal of the project is to give careful attention to the safety and environmental features of a commercial fusion reactor. The STARFIRE Project was initiated in May 1979, with the goal of completing the design study by October 1980. The purpose of this paper is to present an overview of the

major parameters and design features that have been tentatively selected for STARFIRE. (ERA citation 05:017210)

COO-2456-70 PC **A07**/MF **A01**
Columbia Univ., New York. Plasma Physics Lab.
Spectroscopic Study of Turbulent Heating in the High beta Tokamak - Torus II.
G. E. Georgiou. 1979, 144p
Contract EY-76-S-02-2456

Visible spectroscopy, involving line profile and line intensity measurements, was used to study the turbulent heating of the rectangular cross-section high-beta tokamak Torus II. The spectroscopy was done in the visible wave-length region using a six channel polychrometer having 0.2 A resolution, which is capable of radial scans of the plasma. The plasma, obtained by ionizing helium, is heated by poloidal skin currents, induced by a rapid (tau/sub R/ approx. = 1.7 mu sec) change of the toroidal magnetic field either parallel or anti-parallel to the initial toroidal bias magnetic field, which converts a cold toroidal Z-pinch plasma into a hot tokamak plasma. (ERA citation 05:017167)

COO-4259-T2 PC **A02**/MF **A01**
Arizona Univ., Tucson. Engineering Experiment Station.
Progress in Application of Hybrid Numerical Simulation Methods to Magnetic Confinement Systems. Period Covered: March-October 1979.
R. L. Morse. 1979, 21p
Contract EG-77-S-02-4259

Hybrid codes developed to simulate high density, high- beta plasmas have been applied primarily to heating, ignition, and burn of linear reactor systems and to current profile steepening and related stability changes in tokamaks. Some code development has also been done to incorporate Monte Carlo alpha transport and to make it possible to treat rotation and rotational instability in compact tori and linear systems. Also, analytic expressions for temperature profiles and heat loss caused by thermal conduction in compact tori have been obtained. (ERA citation 05:017182)

DOE/DP/40030-1 PC **A16**/MF **A01**
KMS Fusion, Inc., Ann Arbor, MI.
1978 Annual Report on Laser Fusion Research.
R. R. Johnson. 1978, 374p
Contract ED-78-C-08-1598

Progress during this period is reported for each of the following topics: (1) spherical shell fuel containers, (2) polymer research, (3) cryogenic technology, (4) fabrication technology, (5) implosion physics, (6) fast ion measurements of laser-produced spherical plasmas, (7) absorbed energy measurements, (8) diagnostics, (9) fast ion energy loss in dense plasmas, (10) electron transport, (11) ionization equation of state, (12) profile modification by pondermotive forces, (13) pondermotive potential effects on Ohm's law, (14) effect of flux-limited thermal transport on critical surface jump conditions, (15) spherical rarefaction shocks, (16) explosively heated Gaussian objects, (17) bandwidth broadening, (18) frequency doubling experiments, (19) advanced laser candidates, (20) glass laser operation, and (21) 2TW laser upgrade. (ERA citation 05:017254)

EUR-CEA-FC-913 PC **A03**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Vacuum Ultra-Violet Spectroscopy on T.F.R. Tokamak Plasmas.
Sep 77, 33p
U.S. Sales Only.

Spectroscopic measurements in the range 5 to 2000 A on T.F.R. are presented. This machine is a source of large volume, high temperature (kTsub(e) approximately 2keV) and relatively low density (nsub(e) approximately 8.10 exp 13 cm exp -3). The working gas (H sub 2 or D sub 2) is contaminated by light (O, C, N) or heavy (Mo, Fe) impurities, the former being fully ionized in the central region of the plasma, the latter existing as highly charged ions with some remaining bound electrons (Mo exp 30+). Unknown spectra of molybdenum ions are studied in details in the range 5 - 100 A; spatio-temporal behavior of the various impurity ions are studied between 100 and 2000 A. Radiances (Watts cm exp -2 sr exp -1) are interpreted in terms of ion densities through models which are all based on the coronal approximation either at equilibrium (central part of the plasma during current plateau) or in the transient regime (beginning of the discharge and peripheral zone of the plasma). Total radiation losses are deduced. In the range 1200-2000 A, ion temperature is deduced from Doppler measurements of some light impurity lines. (Atomindex citation 10:434515)

EUR-CEA-FC-915 PC **A06**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
High Power Neutral Injection and Ion Power Balance in TFR.
Sep 77, 101p
U.S. Sales Only.

A fast neutral power of 570 kW was injected into TFR. At low density (mean neutral density approximately 2-3 10 exp 13 cm exp -3) the ion temperature doubled and reached 2 keV in the center during injection. The temperature increases linearly with the injected power. The macroscopic perturbation due to the injected power yields some information on the ion behavior and the ion energy confinement time. Some indications that the ion heat conduction might be anomalous are given. The effects of neutral injection on equilibrium, stability and impurity concentration are discussed. (Atomindex citation 10:424457)

EUR-CEA-FC-919 PC **A03**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Vacuum Ultra-Violet Spectroscopy on High-Temperature T.F.R. Tokamak Plasmas.
Sep 77, 26p
U.S. Sales Only.

Spectroscopic measurements, in the range 5 to 2000 A, on T.F.R. are presented. At the temperatures (kTsub(e) approximately 2keV) and the densities Nsub(e) approximately 8 10 exp 13 cm exp -3) existing in the machine, the contaminants of the working gas (H sub 2 or D sub 2) are either fully ionized (light impurities, O, C, N) or stripped to high degrees of ionization (heavy elements, Mo, Fe). Unknown spectra of highly charged molybdenum ions are studied in the range 5 - 100 A; spatio-temporal behavior of the various impurity ions are studied between 100 and 2000 A. Radiances (Watts cm exp -2 sr exp -1) are interpreted in terms of ions densities through models all based on the coronal approximation either at equilibrium (central part of the plasma during current plateau) or in the transient regime (beginning of the discharge and peripheral zone of the plasma). Total radiation losses are deduced. The role of impurities in the electron power balance is discussed. Within the experimental errors in the different terms, the power balance, apart from large radii, is not far from being completely accounted for. (Atomindex citation 10:439095)

EUR-CEA-FC-969 PC **A04**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Description of EMX Computer Code. System for Measuring Soft X Rays.
D. A. Marty, P. Smeulders, and D. Launois. Jul 78, 59p
In French.
U.S. Sales Only.

After briefly describing the system for measuring soft X rays implanted in TFR 600, the objectives and principles of the E.M.X calculation programme are presented. This model is divided into two distinct parts. The ultimate aim of EMX 1, the first part, is to build the soft X ray photo of a plasma with varied characteristics, seen through a certain collimation system (in this case a slit). That of EMX 2, the second part, is to filter the previously built soft X ray photo, by means of the system of absorbents belonging to the measuring system and to calculate the currents generated by each detector aimed at a plasma chord. The first calculation results are commented and discussed. (Atomindex citation 10:489254)

EUR-CEA-FC-978 PC **A03**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Experimental Study on the Losses and Magnetic Fields of Coils Inside a Metallic Liner for T.T.M.P. Heating Application.
J. Brossaud, J. P. Perin, and G. Rey. Nov 78, 49p
In French.
U.S. Sales Only.

The purpose of this work is the improvement of the T.T.M.P. configuration in the Tokamak PETULA in the case of one or three wavelengths. The variation of the magnetic field distribution and the electrical characteristics coils (R/ /,Q, L) inside a metallic liner have been studied as functions of: position and number of coils, radius and width of coils, number of wavelengths along the axis of torus. (Atomindex citation 10:489118)

EUR-CEA-FC-983 PC **A02**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Electron Temperature Measurements from Cyclotron Emission in T-10 Tokamak.
R. Cano, A. A. Bagdasarov, A. B. Berlizov, E. P. Gorbunov, and G. E. Notkin. Dec 78, 25p
U.S. Sales Only.

Measurements of the second harmonic electron cyclotron radiation emitted perpendicular to the magnetic field in the T-10 Tokamak are presented. The comparison with electron temperature obtained by Thomson scattering shows that, in agreement with the hot plasma theory, the plasma radiates like a black-body at the local value of the electron temperature. An experiment showing a correlation between the change in the electron temperature profile obtained by electron cyclotron emission and the onset of the MHD magnetic helical perturbations is discussed. (Atomindex citation 10:489124)

EUR-5791 MF **A01**
Commission of the European Communities, Luxembourg.
JET Project Scientific and Technical Developments 1976.
1977, 660p
U.S. Sales Only. Microfiche copies only.

The JET (Joint European Torus) Project is fully described in EUR 5516e (EUR-JET-R5) 'The JET Project - Design Proposal'. This report describes developments in the project from the stage described in EUR 5516e until late in 1976. An introductory chapter describes the present state of the project and subsequent chapters deal in detail with the following topics: experimental programme aspects; vacuum vessel, pumping system, activation studies; toroidal field coils and mechanical structure; poloidal field system; assembly and maintenance; power supplies; control and data acquisition system; site and buildings. (Atomindex citation 10:419619)

FOA-C-20283 MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Thermonuclear Reaction Rates in a Deuterium-Tritium Plasma.
L. Beckman. Dec 78, 25p
U.S. Sales Only. Microfiche copies only.

In a deuterium-tritium plasma six thermonuclear reactions take place between the deuterons, tritons and the exp 3 He-particles formed in about half of the d-d-reactions. The rate constants for these six reactions have been calculated from the latest evaluations of the reaction cross sections which were available. In some cases, notably the reactions t+t, t+ exp 3 He and exp 3 He+ exp 3 He,

the number of published cross section measurements is small, and the uncertainty in the calculated rate constants consequently large. Analytical expressions for the rate constants as functions of the plasma temperature have been set up. (Atomindex citation 10:478701)

FUPH-R-153 PC **A02**/MF **A01**
Flinders Univ. of South Australia, Bedford Park. School of Physical Sciences.
Possibility of Generating and/or Sustaining the Reversed Field Pinch Configurations by Means of a Transverse Rotating Magnetic Field.
I. R. Jones. Mar 79, 10p
U.S. Sales Only.

The generation of plasma currents using rotating fields is examined. Numerical studies show that, provided the amplitude of the applied rotating field exceeds some value, it completely penetrates the plasma and sets the electrons rotating. An experiment is described which uses this technique to generate a reversed field configuration. Attention is drawn to the usefulness of the technique in generating the equilibrium currents appropriate to a variety of plasma-field configurations. (Atomindex citation 10:489211)

FUPH-R-154 PC **A02**/MF **A01**
Flinders Univ. of South Australia, Bedford Park. School of Physical Sciences.
Production of Plasma Currents Using Transverse Rotating Magnetic Fields.
W. N. Hugrass, I. R. Jones, and M. G. R. Phillips. Apr 79, 16p
U.S. Sales Only.

The current opinion amongst those working with conventionally generated reversed field pinches (RFP) is that it may be possible to sustain the RFP configuration by means of the self-reversal mechanism. This requires a steady low level of plasma turbulence in order to keep the mechanism operable. The author observes that the use of rotating fields should be just as effective in sustaining RFPs as in generating them. (Atomindex citation 10:489197)

FUPH-R-155 PC **A02**/MF **A01**
Flinders Univ. of South Australia, Bedford Park. School of Physical Sciences.
Generation of Screw Pinch/High- beta Tokamak Configurations Using a Transverse Rotating Magnetic Field.
W. N. Hugrass, I. R. Jones, and M. G. R. Phillips. Apr 79, 23p
U.S. Sales Only.

Plasma currents can be driven by means of rotating magnetic fields. In this paper an experiment is described which demonstrates that the screw pinch/high- beta tokamak configuration can be established using the rotating field technique. (Atomindex citation 10:489198)

GA-A-15613 PC **A03**/MF **A01**
General Atomic Co., San Diego, CA.
Impurity Studies and Discharge Cleaning in Doublet III.
F. B. Marcus. Oct 79, 26p CONF-7910124-1
Contract AT03-76ET51011
IAEA technical committee meeting on impurities in tokamaks: source, effect, and control, Alushta, USSR, 8 Oct 1979.

The goal of present and next generation tokamak experiments is to produce high-density, high-purity plasmas during high-power, extended-duration discharges. Plasma discharges with Z/sub eff/ values near unity and low concentrations of medium and high-Z metallic impurities have been obtained in Doublet III using a combination of low-power hydrogen discharge cleaning, gas puffing, precise plasma shape and position control, and high-Z limiters. Analysis of the first wall surface and residual gas impurities confirmed that clean conditions have been achieved. The high-Z limiters showed very limited amounts of melting or arcing. The progress of the wall cleaning process was monitored by three diagnostic techniques: Auger electron spectroscopy of metallic samples at the vessel wall, residual gas analysis, and the resistivity of full power discharges. (ERA citation 05:017269)

IAE-2772 PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Design and Physical Principles of the T-12 Ring Tokamak with Two Axial Symmetrical Divertors.
A. V. Bortnikov, N. N. Brevnov, S. N. Gerasimov, A. M. Zhokin, and A. A. Kazachkov. 1977, 28p
In Russian.
U.S. Sales Only.

Investigated are the problems connected with elaboration of methods for diminishing impurities entering plasma and utilization of axial symmetrical divertor for this aim. In particular, considered is the possibility of providing conditions for external (beyond separatrix surface) extraction of magnetic field lines in the divertor during all stages of discharge current flow. Studied are the plasma filament stability in relation to vertical displacement and the influence of physical processes in the divertor layer on plasma filament parameters. Physical parameters of the plasma filament are determined. Considered is the problem of providing operating conditions for an "ideal" divertor, in which full absorption of entering plasma flux takes place. The investigation in the plasma filament of oblonged cross section with the following plasma parameters: n approximately 5x10 exp 15 cm exp -13 , T approximately 500 eV, tausub(E)(>approximately)1ms, beta sub(J) approximately 1 were carried out on a ring tokamak with two axial symmetrical divertors, the construction and physical principles of which are presented. (Atomindex citation 10:434542)

IAE-2790 PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Structure of Magnetic Field Disturbances During Breakaway Instability in the T-6 Tokamak.
V. G. Merezhkin. 1977, 29p
In Russian.
U.S. Sales Only.

The poloidal field structure and disturbance dynamics under developing the thyrring instability using "Tokamak-6" are considered. The experiment consisted in studying well-reproducible discharge conditions with a plasma current of 50 kA, a longitudinal field of 5 kOe, and parameter q approximately 2.5. Under these conditions at the steady discharge stage plasma has been characterized by the following parameters: anti nsub(e) approximately 5.5x10 exp 12 cm exp -3 ; Tsub(e) approximately 280 eV; Tsub(i) approximately 140 eV; beta sub(tau) approximately 0.25. The behavior of the symmetric and dipole field components and helical disturbance features on minor and major instabilities are analyzed. The governing role of the helical disturbances with harmonics m=2 at the initial stage of the instability development is shown. The symmetric and helical components of the poloidal field disturbances at the front of their build up have been found to be correlated. Data on helical disturbance increments, scale and structure, relationships between the symmetric and helical field components and typical energy loss by plasma are presented. (Atomindex citation 10:434668)

IAE-2835 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Effect of Neutral Atom Beam Injection on Plasma Diffusion in the Plateau and Pfirsh-Schlutter Regimes.
V. V. Fomenko. 1977, 12p
In Russian.
U.S. Sales Only.

The effect of neutral particle injection on mass and heat transfers in the Tokamak plasma is considered on the basis of the kinetic equation for plasma electrons. Expressions for particle and heat flux variations due to the beam presence for the plateau and Pfirsch-Schluter modes have been obtained by means of the stationary beam distribution function. It has been found that the effect of the beam on heat transfer from plasma by ions constitutes about msub(e)/msub(i))sup(1/2)-th part of heat transfer due to the ion thermal conductivity. (Atomindex citation 10:434594)

IAE-2881 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Thermal Losses in the High Temperature Blanket of a Thermonuclear Reactor.
E. V. Murav'ev. 1977, 16p
In Russian.
U.S. Sales Only.

A simple mathematical model is presented which allows to evaluate the optimal thermal insulation parameters and thermal losses from the high temperature blanket of a thermonuclear reactor into the cooling circuits of relatively "cold" elements of the plant, e.g. of the first wall. The effect of such parameters as insulation thickness and temperature on the level of thermal losses is illustrated by the numerical data. The use of highly effective thermal insulation of the optimum thickness is shown to be necessary. (Atomindex citation 10:419676)

IAE-2906 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Study on Plasma Visible Radiation Spatial Distribution at the TO-1 Tokamak.
L. I. Molotkov, and N. N. Shvindt. 1977, 12p
In Russian.
U.S. Sales Only.

The results of spatial distribution measurements of radiation intensities of spectral lines of hydrogen and light plasma impurities in the visible-light spectrum TO-1 tokamak are described. The method of electrochemical scanning with the help of rotating disk with notches was used. The experiments were carried out in the stable regime of discharge and in the regime with breakdown instability. In the stable regime absolute intensities of the spectral lines were measured. The concentration of radiating atoms and ions were calculated using the measured absolute intensities. Besides in order to determine the region in which the discharge appears in the cross section of the TO-1 chamber the spatial distributions of H sub(beta) neutral hydrogen spectral line in the initial stage of the discharge (0<t<1 mc) were obtained. In the unstable regime of the discharge the effect of instability on the time dependence of the spectral line intensities and on their spatial distributions was studied. The described spectroscopic method permitted to obtain the filament cross section distribution of C(3) carbide ion and neutral hydrogen atom concentrations in the stable discharge regime. The distributions obtained have the form of the graphs with a dip in the central part and a maximum close to the plasma periphere. The average filament cross section concentration values are the following: anti nsub(C(3))=8.2x10 exp 9 cm exp -3 for the C(3) ion and anti nsub(0)=1.1x10 exp 10 cm exp -3 for hydrogen atoms. The investigation into spatial distributions of the Hsub(beta) line radiation in the initial stage of the filament formation showed that in the overwhelming majority of cases the discharge appears near the internal wall of the tokamak chamber. (Atomindex citation 10:434678)

IAE-2908 PC **A02**/MF **A01**
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii.
Determination of Ion Temperature from the Spectra of Neutral-Particle Charge Exchange.
Yu. N. Dnestrovskii, D. P. Kostomarov, and S. E. Lysenko. 1977, 20p
In Russian.
U.S. Sales Only.

The density and spectrum of neutrals are calculated with the aim of determining the ion temperature of optically thick plasma from the charge exchange of the neutrals at the centre of a plasma filament. The effect of the following factors on the spectrum of the emerging neutrals was taken into account: 1) the neutrals density at the centre of the filament is much less (by 3-4 orders) than on the periphery, and when the optical thicknesses are large it is determined by recombination; 2) even energetic neutrals with an energy of 5-10 keV experience several charge exchanges in their flight from the filament centre to the boundary and emerge from plasma with an altered energy. The asymptotic formulas for model problems were obtained, and the results of numerical calculations for experiments

on the T-10 and "Alcator" devices are presented. The calculated corrections to the ion temperature measured are 10-15% at neutrals energies of approximately 8 keV. The recombination effect substantially increases the neutrals density in the central layers of plasma. The algorithms proposed for processing experimental spectra make it possible to restore the temperature profile from the spectrum of the charge-exchange neutrals and to take into account the finite optical thickness of plasma, and also to use the information contained in the low-energy part of the spectrum. (Atomindex citation 10:439149)

IAE-2978 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Plasma Heating Simulation in the T-11 Device on the Neutral Atom Beam Injection.
Yu. N. Dnestrovskii, D. P. Kostomarov, and S. E. Lysenko. 1978, 20p
In Russian.
U.S. Sales Only.

Calculations of the energy balance in the tokamak with injection of hot atom beams are carried out. Considered are atom ionization and capture of the produced ones as well as the transmission of energy to plasma. Energy losses on recharging are taken into account. Given are temperature dependencies on injection power, plasma density and other parameters. A possibility to obtain collisionless regime by ions is described. (Atomindex citation 10:489145)

IAE-3008 PC **A02**/MF **A01**
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii.
Kinetic Method of Drift Effect Investigation in MHD-Modes of Tokamak.
A. B. Mikhailovskii, and G. I. Suramlishvili. 1978, 8p
In Russian.
U.S. Sales Only.

Plasma kinetic description was proposed to elucidate the role of drift effects in the tokamak MHD-modes, which is of importance for the regimes of rare collisions characteristic for thermonuclear tokamaks. Investigated were the kinetic drift instabilities, connected with the Sidem disturbances under the conditions when MHD instability of these disturbances is suppressed by the effect of the Larmour finite radius of ions. Such kinetic instabilities are shown to take place at nu < 0 and nu > 2/3, where nu --deltaInTsub(o)/deltaInnsub(o) Tsub(o) and nsub(o) being plasma temperature and density. (Atomindex citation 10:439245)

INIS-mf-4570 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
What Has the Reactor Meeting in Hanover Brought. A Special Section on Fusion Technology - KTG Discusses First Wall Problems.
1978, 2p
In German.
U.S. Sales Only.

The report deals with thermonuclear aspects of the reactor meeting. These aspects concerned the Garching systems studies, safety and environmental problems, radioactive waste in fusion reactor power plants, an intermediate circuit between primary circuit and steam process, structural materials, and a comparison between fast breeders and fusion reactors. (Atomindex citation 10:419603)

INIS-mf-4682 MF **A01**
Sydney Univ. (Australia). School of Physics.
Measurement of the Spectrum of Tokamak Electron Cyclotron Emission on a Submillisecond Time Scale.
D. V. Bartlett, L. C. Robinson, and A. E. Costley. Feb 78, 12p
U.S. Sales Only. Microfiche copies only.

An experiment is described in which the spectrum of electron cyclotron emission from a tokamak plasma is measured in a time interval of about 0.5 ms using a plasma-scanned Michelson interferometer. Results obtained from data taken during the tokamak current plateau, when the emission is known to remain relatively constant, are compared with those obtained using a slower (about 10 ms) mechanically scanned interferometer. Good agreement is found. The first measurements of the emission spectrum during the current rise are presented. (Atomindex citation 10:424461)

IPP-III/46 PC **A02**/MF **A01**
Max-Planck-Institut fuer Plasmaphysik, Garching (Germany, F.R.).
Observation of Internal Modes in the Electron Density in the Pulsator Tokamak.
N. Gottardi. Jul 78, 11p
U.S. Sales Only.

A set of preliminary experimental results of the investigation of fast density variations in Pulsator by means of interferometric measurements shows the presence of internal modes in the electron density as well as in soft X-ry emission. (Atomindex citation 10:439176)

IPP-6/172 PC **A02**/MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).
Application of the Two-Fluid Energy Principle to Large Aspect Ratio Tokamaks.
I. L. Caldas, and H. Tasso. May 78, 17p
U.S. Sales Only.

An 'energy principle' derived in an earlier publication is applied to the stability of shaped large-aspect-ratio tokamaks. Most of the previous results on MHD, resistive and universal-type instabilities can be recovered in a simple way that demonstrates the power of this formalism. This allows 3 D tearing modes for general cross-sections to be investigated. An exact proof of the dissipative universal instability is given at least within the assumption of adiabatic motion. The relation of this to current work on collisionless drift waves is discussed. (Atomindex citation 09:415629)

Juel-1503 PC **A02**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Plasmaphysik.
Criterion for Plasma-Wall-Interaction in a Reactor.
W. Bieger, K. H. Dippel, and G. H. Wolf. May 78, 19p
U.S. Sales Only.

A criterion is formulated for the permissible degree of plasma-wall-interaction of a thermonuclear plasma. Taking the growth of alpha -particle concentration as a measure, the criterion is expressed in form of a simple relation between few characteristics such as 'relative toxicity' and 'energy related material yield'. The criterion is applied to the example of sputtering by fuel particles in the presence of a cool plasma mantle showing that high-Z materials like tungsten might become advantageous if the 'temperature' of the bombarding particles is in the range between 10 and 25 eV. (Atomindex citation 09:415616)

JAERI-M-7479 MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Annual Report of Division of Thermonuclear Fusion Research and Division of Large Tokamak Development for the Period of April 1, 1976 to March 31, 1977.
Feb 78, 334p
U.S. Sales Only. Microfiche copies only.

Research and development activities in the two divisions are closely related. 1) Theoretical and computational studies continued on tokamak confinement and heating related to experimental problems. Studies on NBI heating in JT-60 were completed. 2) Experimental studies on impurities, density control and effects of density fluctuations were made in JFT-2. Neutral beams up to 30 keV and 8 A were injected into JFT-2 plasma perpendicularly. The ion temperature was increased by 10% - 15%, which is in agreement with the prediction by classical Fokker-Planck theory. In JFT-2a(DIVA), plasma-wall interaction (behavior of heavy and light impurities) was studies. The divertor of DIVA reduced the plasma-wall interaction and hence the radiation loss due to heavy impurities by a factor of 3. A grazing-incidence vacuum monochromator was first used in impurity studies in JFT-2 and JFT-2a. 3) Technological improvements were made raising efficiencies of operation, maintenance and plasma research. 4) Neutral beam injector test stand ITS-2 of 100 keV was completed. Construction of a 200 kW, 650 MHz radiofrequency heating system for JFT-2 was started. 5) Sputterings of molybdenum and pyrolytic graphite by low-energy protons and chemical reaction rates of pyrolytic graphite with protons were measured. Honeycomb structure greatly reduced the sputtered particles. 6) The superconducting magnet development group made the design of cluster test apparatus and the development of large current superconductor. 7) Phase-I preliminary design of experimental fusion reactor JXFR was completed and preliminary safety evaluation of JXFR was made. 8) Detailed design of JT-60 was completed in November 1976. Engineering development contracts were all completed by March 1977. 9) Engineering studies and tests on critical components of JT-4 with non-circular plasma cross section and divertors were made, after the preliminary design in fiscal year 1975. (Atomindex citation 10:424520)

JAERI-M-7543 MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Magnetic Field and Stress Analysis for ORNL-LCT.
K. Yoshida, T. Ando, and S. Shimamoto. Feb 78, 37p
In Japanese.
U.S. Sales Only. Microfiche copies only.

Magnetic field and stress analysis results are described. For a toroidal field coil in the Large Coil Task at ORNL, Nb-Ti alloy superconducting conductor has number of problems in magnetic field and current density for further study. The maximum Von Mieses stress, however, is lower than the yield stress. (Atomindex citation 10:424618)

JAERI-M-7546 MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Study of Thermal Problems in ORNL-Large Coil Task.
Y. Hosoda, and S. Shimamoto. Feb 78, 37p
In Japanese.
U.S. Sales Only. Microfiche copies only.

Thermal problems in the ORNL-Large Coil Task specification have been studied, including stability, nuclear heating simulation, initial cooling and warm-up. The conditions for half turn of the coil to recover the superconducting state after a normal transition were obtained in stability problem. Nuclear heating simulation test has little problem in the heater test. Operation time and thermal stress in the initial cooling and warm-up are calculated. (Atomindex citation 10:424510)

JAERI-M-7611 MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Calculation of Heat Input to Cryopumps by Monte Carlo Method.
J. Sakuraba, and T. Sibata. Mar 78, 21p
In Japanese.
U.S. Sales Only. Microfiche copies only.

A two-dimensional Monte Carlo calculation code was made for estimating the heat input to cryopumps for hydrogen. It calculates the following: (1) energy distribution and reflection efficiency of the backscattered particles from the beam dump, (2) molecular flow rate and energy distribution of the backscattered energetic particles through the chevron baffle, and (3) radiation transmissivity of the chevron baffle . For cryopumps of the neutral beam injection systems for JAERI's plasma feasibility experiment device JT-60, the heat input to the cryopanel due to backscattering and radiation was estimated with the code. (Atomindex citation 10:424584)

JAERI-M-7853 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Report on the Design of JT-4.
A. Kitsunezaki, S. Seki, H. Yokomizo, T. Matsuda, and R. Saito. Aug 78, 52p
U.S. Sales Only.

The present status of design of JT-4 tokamak is described. The objectives of JT-4 are shown graphically and the main parameters are tabulated. JT-4 is a tokamak of non-circular (ellipse or D-shape) plasma cross section with axisymmetric di-

vertors at top and bottom of the plasma column. The principal purpose of JT-4 is to obtain high plasma beta values, desirably exceeding 5%, by strong secondary plasma heating and by impurities elimination. The experimental results obtained with JT-4 are essential in the design of future tokamaks and tokamak reactors with high efficiency and at reasonable cost. (Atomindex citation 10:489224)

JAERI-M-7915 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Sensitivity Analysis of Neutronics Calculation in the Preliminary Design of Japan Experimental Fusion Reactor.
M. Yamauchi, and H. Iida. Oct 78, 70p
In Japanese.
U.S. Sales Only.

Uncertainties of neutronics calculation in the first preliminary design of Japan Experimental Fusion Reactor (JXFR) have been evaluated by sensitivity analysis based on linear perturbation theory. Uncertainties were estimated of the (n,p) reaction rates of exp 58 Ni and exp 54 Fe in outer superconducting magnet (SCM), the displacement rate in the stabilizer (Cu) in inner SCM, and the tritium breeding ratio in outer blanket. The (n,p) reaction and the Cu displacement are most sensitive to the cross section of Fe, a major constituent of the blanket structure, and the tritium breeding ratio is so to the cross sections of exp 7 Li and exp 16 O in Li sub 2 O. The calculation of induced activity and radiation damage in SCM is equivalent to solving the deep penetration problem; cross section perturbation has large influence on the results of this problem. Taking into account the uncertainty of the cross section data, the uncertainties of (n,p) reaction and Cu displacement rate are 30 -- 40%, which little lower reliability of the neutronics calculation in the first preliminary design of JXFR. (Atomindex citation 10:489381)

JAERI-M-8017 MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Stress Analysis of the JT-60 Vacuum Vessel.
H. Takatsu, M. Shimizu, M. Yamamoto, and M. Ohta. Dec 78, 67p
In Japanese.
U.S. Sales Only. Microfiche copies only.

Stress analysis of the JT-60 vacuum vessel is reported in the parameter ranges of rigid ring thickness 40 - 70 mm and bellows thickness 2.0 - 2.5 mm for the structure in detailed design. The needs of stiffening ribs and dash-pots against the electromagnetic forces are discussed and also integrity of the vacuum vessel in plasma disruptions with time constant shorter than 50 msec. Calculations show that the maximum stress intensity produced in the vacuum vessel is below the allowable one even without the stiffening ribs and dash-pots. And, the larger the bellows thickness the higher becomes the safety margin; thickness of the rigid ring little influences the stress intensity. In plasma disruptions with time constant shorter than 1 msec, the stress intensity exceeds the allowable one. (Atomindex citation 10:489355)

KIYI-77-20 PC **A02**/MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Yadernykh Issledovanii.
Instability of Energy Balance and Particle Number in Thermonuclear Plasma.
S. N. Reznik. 1977, 11p
In Russian.
U.S. Sales Only.

The features of stationary solutions of energy balance and particle number in thermonuclear plasma are studied using the differential equation qualitative theory. The study is carried out for some dependences of plasma energy confinement time tausub(E)(n,T) upon concentration n and temperature T. It is shown that at tau sub(E) approximately T sup(-1) a periodic thermonuclear reaction process is possible. (Atomindex citation 10:419693)

NIIEFA-B-0374 MF **A01**
Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (USSR).
Shielding Effect Estimation of a Toroidal Magnetic Field Winding on a Control Magnetic Field in Tokamaks.
Yu. T. Puzynovich. 1978, 19p
In Russian.
U.S. Sales Only. Microfiche copies only.

The possibility of distortion of controlling (vertical) magnetic field in tokamaks due to the shielding effect of the winding of longitudinal (toroidal) field at the disposition of current-carrying "controlling" turns outside of the longitudinal field winding is investigated. The extreme case is considered. It is supposed that the normal component of the controlling field in the vicinity of the longitudinal winding conductor surface is completely compensated by the field of induced eddy currents, i.e. normal component of the composite field is equal to zero. So the problem is to determine the eddy current field with further determination of the composite field. The problem is solved by the method of successive approximations, i.e. the solutions of the auxilary external Neuman problems are found. On the basis of this method, a calculation program for the BESM-6 computer is written, and the calculations are made for the tokamak model with the longitudinal field winding, consisting of 24 sections of toroidal configuration. The big radius of the winding Rsub(o) was supposed to be equal to 250 cm, l and a were equal to 130 cm and 13 cm, respectively. The external controlling magnetic field antiBsub(o) was taken to be uniform. It is clear from the calculation results that in the range of R change, where the longitudinal winding is situated (150-320 cm), the magnetic field B is 6%-2% weaker than the magnetic field Bsub(o), but it surpass Bsub(o), outside of these limits (< 150 and > 320 cm). (Atomindex citation 10:439270)

NIIEFA-B-0378 PC **A02**/MF **A01**
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow.
Experimental Study Results of the Stressed-Strained State of the Forced Frame for the Toroidal Field Winding in the "Tokamak-10".
V. A. Karnaukh, O. V. Semenov, and Yu. V. Spirchenko. 1978, 9p
In Russian.
U.S. Sales Only.

The object of the tests is the main frame of the winding unit of the Tokamak-10 toroidal field. The tests were carried out for the purpose of determining the stress-strain state of the main frame under the effect of ponderomotive forces acting in the plane of the winding unit, at 5T magnetic fields on the torus axis. The temperature of the main frame of the winding unit varied in the range from 25+-10 C to 80 deg C. It was established that the stresses obtained at the sites of location of strain gauges differ from the calculated ones by less than 20%. The experiment on determining the stress-strain state of the main frame of the winging unit of the toroidal field showed that the applied method of analytical calculation makes it possible to determine, with a sufficient degree of accuracy, the operability of this element in tokamaks. (Atomindex citation 10:439212)

NIIEFA-LM-0403 MF **A01**
Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (USSR).
Algorithm for Study of a Stress-Strained State of a Fusion Reactor Outer Chamber.
V. V. Eliseev, P. A. Zhilin, V. A. Pal'mov, Yu. V. Spirchenko, and R. V. Chvartatskii. 1978, 9p
In Russian.
U.S. Sales Only. Microfiche copies only.

The stress-strained state of an outer chamber i.e. one of the main elements of fusion reactors is studied. The problem is solved by the asymptotic methods of the elasticity theory using the regularization methods of divergent integrals. Based on the solution of this problem a formula is derived describing radial motion in a smooth torus under pressure, and a simple algorithm is constructed for studying the stress-strained state of a double torus-like shell fastened with stiffness ribs. Numerical results for the chamber with the T-20 device geometrical parameters are given. The analysis of the numerical results permits to make the following conclusions: 1. Meridional stresses reach their highest value in the maximum approach points to the torus rotation axis. Circuit stresses in these points have the minimum values. From the point of view of the strength theory it is favourable, because equivalent stresses appear to be distributed relatively uniformly. 2. In the points of fastening of stiffness ribs sufficient increase of local stresses is observed. These stresses are higher on the inner torus than on the outer one, whereas the main stresses on the inner torus less than on the outer one. That also leads to the leveling of the general stressed state. 3. In the whole, stiffness rings increase the constructiion supporting power and, in particular, increase its stability. (Atomindex citation 10:439155)

NRCN-472 PC **A02**/MF **A01**
Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev.
Hybrid Reactor Blankets for Constant Energy Multiplicaton and Flat Power Distribution.
E. Greenspan, A. Schneider, A. Misulovin, and D. Gilai. Nov 78, 23p
U.S. Sales Only.

Two blanket design difficulties are usually attributed to the blanket neutronic properties: high peak-to-average power density distribution and the variaton of the energy multiplicaton with burnup. This work shows that blankets can be designed to have a constant energy multiplication and a flat power distribution. These features are illustrated for light water hybrid reactor blankets. (Atomindex citation 10:441693)

PPPL-1632 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
OCLATOR (One Coil Low Aspect Toroidal Reactor).
S. Yoshikawa. Feb 80, 23p
Contract EY-76-C-02-3073

A new approach to construct a tokamak-type reactor(s) is presented. Basically the return conductors of toroidal field coils are eliminated and the toroidal field coil is replaced by one single large coil, around which there will be placed several tokamaks or other toroidal devices. The elimination of return conductors should, in addition to other advantages, improve the accessibility and maintainability of the tokamaks and offer a possible alternative to the search for special materials to withstand large neutron wall loading, as the frequency of changeover would be increased due to minimum downtime. It also makes it possible to have a low aspect ratio tokamak which should improve the beta limit, so that a low toroidal magnetic field strength might be acceptable, meaning that the NbTi superconducting wire could be used. This system is named OCLATOR (One Coil Low Aspect Toroidal Reactor). (ERA citation 05:017213)

RISO-378 PC **A02**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Estimations of the Effect of alpha Particles on a Refuelling Pellet.
C. T. Chang, and H. L. Pecseli. Apr 78, 19p
U.S. Sales Only.

The effect of the alpha -particle from the D(T,n) alpha reaction on a 3 mm solid deuterium pellet was studied by disregarding the optimum of the refuelling process and limiting attention to the feasibility of pellet refuelling alone. A comparison of the refuelling period required with the slowing-down time of the alpha -particle in a D exp + ,e plasma corresponding to a 2.5 GW(e) reactor showed that the pellet is first subjected to the direct impact of alpha -particles of around 2-3 MeV energy. The penetration depth of these particles in the pellet is comparable to that of a 20 keV electron. If the temperature of the ablated cloud created around the pellet is about 1 eV, a cloud radius of about 20 cm is required for the subsequent thermalization of the alpha -particles. (Atomindex citation 10:424476)

TRITA-PFU-77-08 PC **A03**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Institutionen foer Plasmafysik med Fusionsforskning.
Conditions of Existence of Cold-Blanket Systems.
B. Lehnert. Dec 77, 45p
U.S. Sales Only.

An extended analysis of the partially ionized boundary layer of a magnetized plasma has been performed, leading to the following results: (i) In a first approximation the ion density at the inner "edge" of the layer becomes related to the wall-near neutral gas density, in a way being independ-

ent of the spatial distribution of the ionization rate. (ii) The particle and momentum balance equations, and the associated impermeability condition of the plasma with respect to neutral gas penetration, are not sufficient to specify a cold-blanket state, but have to be combined with considerations of the heat blance. This leads to lower and upper power input limits, thus defining conditions for the existence of a cold-blanket state. At decreasing beta values , or increasing radiation losses, there are situations where such a state cannot exist at all. (iii) It should become possible to fulfill the cold-blanket conditions in full-scale reactors as well as in certain model experiments. Probably these conditions can also be satisfied in large tokamaks like JET, and by fast gas injection in devices such as Alcator, but not in medium-size tokamaks being operated at moderately high ion densities. (iv) A strong "boundary layer stabilization" mechanism due to the joint viscosity-resistivity-pressure effects is available under cold-blanket conditions. (Atomindex citation 10:434653)

TRITA-PFU-78-05 PC **A02**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Institutionen foer Plasmafysik med Fusionsforskning.
Thermonuclear Power and Radiation Losses in an Intrap Reactor System.
T. Elevant, and G. Hellblom. Apr 78, 25p
U.S. Sales Only.

Total thermonuclear power and bremsstrahlung losses are determined for a reactor system based on the "Intrap" configuration under flute stable conditions and a simple density-temperature relation. Also the influence from a boundary layer with variable thickness is studied. Some numerical examples are given as illustration of the obtained results. (Atomindex citation 10:434585)

UCID-18223 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Tokamak Fusion Test Reactor (TFTR) Neutral Beam Line Vacuum Chamber Cover Structural Analysis.
D. L. Humphrey, and L. R. Pedrotti. 10 Sep 79, 11p
Contract W-7405-ENG-48

The Tokamak Fusion Test Reactor (TFTR) vacuum chamber cover is sealed by 0-rings without the aid of mechanical fasteners. Under vacuum loading and component weights, the edges lifted no more than 0.005 in. (by a SAP4 computer code analysis). This report explains the model used for this investigation and, in addition, shows the maximum deflection expected at the center of the cover is less than 0.047 in. Also, no stresses are expected to exceed 13,700 psi. (ERA citation 05:017271)

UCID-18496(Pt.1) PC **A16**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Physics Basis for MFTF-B.
D. E. Baldwin, B. G. Logan, and T. C. Simonen. 16 Jan 80, 367p
Contract W-7405-ENG-48

The physics overview covers the following topics: (1) classical energetics, (2) single-particle adiabaticity and drift effects, (3) equilibrium considerations, (4) low-frequency stability, (5) microstability of plugs and barriers, and (6) electron axial thermal conduction. Operation scenarios and summaries of initial TMX results are also described. (ERA citation 05:017214)

UCID-18496(Pt.2) PC **A10**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Physics Basis for MFTF-B.
D. E. Baldwin, B. G. Logan, and T. C. Simonen. 16 Jan 80, 209p
Contract W-7405-ENG-48

The physics topics included here are the following: (1) adiabaticity, (2) MHD stability, (3) radial transport, (4) barrier physics, (5) loss-cone instability, (6) effect of gas recycling and secondary electron emission, (7) Monte Carlo simulations of tandem mirror physics, (8) charge-exchange pumping of thermal barriers, (9) vacuum pumping in the A-cell, and (10) microstability in the central cell. (ERA citation 05:017205)

18B. Isotopes

IEA-INF-066 MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil). Centro de Engenharia Quimica.
Jet Nozzle Process for Uranium 235 Isotopic Enrichment.
I. Jordan, K. Umeda, and A. E. P. Brown. Mar 79, 38p
In Portuguese.
U.S. Sales Only. Microfiche copies only.

A general survey of the isotopic enrichment of Uranium - 235, principally by jet nozzle process, is made. Theoretical treatment of a single stage and cascade of separation stages of the above process with its development in Germany until 1976 is presented. (Atomindex citation 10:480283)

18D. Nuclear Instrumentation

AECL-5973 PC **A03**/MF **A01**
Atomic Energy of Canada Ltd., Sheridan Park (Ontario). Power Projects.
Measurements and Simulations of Thermal Neutron Flux Distributions in Bruce A.
V. K. Mohindra, G. Kugler, and A. M. Lopez. Apr 78, 33p
U.S. Sales Only.

During the zero power commissioning phase of unit 1 of the Bruce A Nuclear Generating Station the thermal neutron flux distribution was measured for several different core configurations. Measurements were made with copper wire activation, with a travelling fission chamber, and with fixed self-powered flux detectors. Comparisons between data obtained from copper wire activation and a travelling fission chamber show that both techniques are capable of measuring relative flux distributions to a precision of less than one per cent. The flux distributions were also simulated with appropriate reactor physics codes. Comparisons between simulated and measured flux distributions showed very good agreement. Average discrepancies between simulated fluxes and copper wire activation data ranged from two to three percent. Comparisons with self-powered detector measurements produced average discrepancies ranging from six to eight percent. The larger discrepancies in these comparisons are believed to be mostly due to variations in detector sensitivities. (Atomindex citation 10:427113)

AECL-6209 PC **A03**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Development of Irradiated Fuel Bundle Counters for 600 MW CANDU Reactor Safeguards Systems.
V. H. Allen, W. R. J. Shorey, and A. J. Stirling. Jul 78, 37p
U.S. Sales Only.

The report describes the specifications, design principles and the development program to produce irradiated fuel bundle counters for 600 MW CANDU reactors. The safeguards counters will provide the IAEA with a secure and independent means of estimating the number of fuel bundles transferred to the spent fuel bay between inspections. The technical requirements of the bundle couner sound simple. However, location, reliability, security and operating requirements make the counters highly "intelligent" instruments. Specifications which are imposed on these unattended safeguards instruments include independence from continuous station services, concealment of operating status, and tamper resistance and indication. Fuel bundles pass sequentially through the field-of-view of four Geiger counters for detection. A microprocessor analyzes the sequence of the Geiger counter signals and determines the number and direction of bundles transferred. The readout for the inspector includes both a bundle tally and a printed log of the times and dates of transfers. (Atomindex citation 10:427537)

CONF-791037-24 PC **A02**/MF **A01**
Environmental Monitoring Systems Lab., Las Vegas, NV.
Automated TLD System for gamma Radiation Monitoring.
P. C. Nyberg, J. D. Ott, C. M. Edmonds, and J. L. Hopper. 1979, 22p
Contract EY-76-A-08-0539
IEEE nuclear science symposium, San Francisco, CA, USA, 17 Oct 1979.

A gamma radiation monitoring system utilizing a commercially available TLD reader and unique microcomputer control has been built to assess the external radiation exposure to the resident population near a nuclear weapons testing facility. Maximum use of the microcomputer was made to increase the efficiency of data acquisition, transmission, and preparation, and to reduce operational costs. The system was tested for conformance with an applicable national standard for TLD's used in environmental measurements. (ERA citation 05:016411)

EFI-267(60)-77 PC **A02**/MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
"Depth " Dependence of Energy Flux Absorption Range in the Iron Absorber of an Ionization Calorimeter.
M. I. Keropyan, R. M. Martirosov, and M. P. Pleshko. 1977, 11p
In Russian.
U.S. Sales Only.

The L/sub hFe/ energy absorption range of a primary hadron in the interaction with iron nuclei and its dependence on the depth l of nuclear-electron shower generation in an iron absorber of an ionization calorimeter were measured at E> =600 GeV. It was shown that L/sub hFe/ decreased depending on l. With increasing l in iron a value of maximum ionization increased in some ionization chambers. It was concluded that with increasing depth of hadron interactions in iron the partial composition of interacting hadrons was changing. (Atomindex citation 10:468190)

KFK-2589 PC **A07**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik.
Neutron Noise Analysis for Malfunction Diagnosis at Sodium Cooled Reactors.
P. Hoppe. Sep 78, 145p
In German.Thesis.
U.S. Sales Only.

For the investigation of the potential use of neutron noise analysis at sodium cooled power reactors, measurements have been performed at the KNK I reactor over a period of 18 month under different operational conditions. The signal fluctuations of the following tranducers have been recorded: In-core and Ex-core neutron detectors, temperature-, flow-, pressure-, vibration- and acoustic sensors. These extensive measurements have been analyzed in the frequency range from 0,001 Hz to 1000 Hz with all currently known methods for the identification of noise sources. The following results have been found: - Neutron noise for f<1 Hz is due to reactivity fluctuations only, for f>20 Hz the white detection noise prevails. In the region from 1 Hz to 20 Hz the vibrations of core components contribute to neutron noise. - Neutron noise is influenced by the state of the plant. - The contributions to neutron noise due to the fluctuations of coolant flow and inlet temperature are small compared to those produced by the movements of the control rod initiated by the reactor control system. The quantitatively unidentifiable amount of reactivity fluctuations (0,6 time-dependent thermal bowing of the core. With respect to these results and by calculation of the neutron noise patterns to be expected for the SNR 300, the following possible applications for neutron noise analysis have been found: By means of neutron noise analysis only reactivity fluctuations can be identified and supervised which are produced by time dependent changes of the core geometry. Furthermore neutron noise analysis is well suited for a sensitive detection of control rod vibrations and of local sodium boiling. Finally it can be used for the surveillance of the proper functioning of the reactor control system and of the control rod drive mechanism. (orig./HP) 891 HP. (Atomindex citation 10:433508)

LA-UR-80-443 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.

Improved Kanne Tritium Monitoring System.
D. F. Anderson, and R. D. Hiebert. 1980, 13p
CONF-800211-4
Contract W-7405-ENG-36
International symposium on management of gaseous wastes from nuclear facilities, Vienna, Austria, 18 Feb 1980.

A Kanne chamber has been redesigned to reduce its sensitivity to such contaminants as tritium water vapor and tritiated oil. The high voltage electrode has been replaced by a wire cylinder and the collection electrode has been reduced in diameter. The sensitivity to contamination of the chamber has been reduced by about a factor of 40. The design allows for decontamination of the chamber in place. The improved electronics used is also discussed. (ERA citation 05:016399)

NUREG/CR-1452 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Further Testing of Pocket-Sized Electronic Dosimeters,
R. A. Fox, C. D. Hooker, and B. T. Hogan. May 80, 23p PNL-3364
Contract DE-AC06-76RLO1830

The experiences of industrial radiographers have indicated that electronic radiation-warning devices become inoperative when they are used under some types of ambient conditions. This report, as a followup to NUREG/CR-0554, documents the nature of tests performed on several additional commercially available models. None of the three models tested passed the tests for ruggedness and severe environmental conditions. However, all models passed most of the requirements of a Health Physics Society draft standard of performance specifications for these devices. The test procedures are discussed and conclusions from the tests and recommendations concerning potentially useful modifications to existing devices are presented.

18E. Nuclear Power Plants

AED-Conf-77-329-010 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Power Plant Technology - Changes in Tasks and Problems.
K. Knizia. 1977, 1p CONF-7710166-1
In German.Problems of nuclear energy supply - chances, risks and perspectives in a changing energy economy, Bonn-Bad Godesberg, F.R. Germany, 3 Oct 1977.
U.S. Sales Only.

No abstract available.

AED-Conf-77-646-003 MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation (ZAED), Eggenstein-Leopoldshafen (Germany, F.R.).
External Hazards in Reliability and Risk Assessment of Nuclear Power Plants.
J. D. Stevenson. 1977, 27p CONF-7709183-1
International conference on structural safety and reliability (ICOSSAR '77), Muenchen, F.R. Germany, 19 Sep 1977.
U.S. Sales Only. Microfiche copies only.

It is current practice in the design of nuclear power generating stations to protect against the effects of significant natural and man-made external hazards which can occur at the plant site in excess of those hazards normally considered for conventional facilities. This paper is meant to identify those postulated external hazards typically considered in nuclear facility design. The paper also attempts to fulfill the following four objectives: (1) define the current state of the art in applying reliability and risk analysis to determine external hazard design requirements; (2) provide a ready source of literature references applicable to probabilistic design for extreme loads; (3) provide some quantitative probability assessment estimates of external hazards; (4) develop exclusion criteria by which postulated external hazards can be eliminated as a design basis. (Atomindex citation 10:430364)

INIS-mf-4186 MF **A01**
Ustav pro Vyzkum a Vyuziti Paliv, Bechovice (Czechoslovakia).
Nuclear Power and Heating Plant in the Urban Agglomeration of Prague.
J. Himmel, and V. Verner. Mar 75, 30p
In Czech.
U.S. Sales Only. Microfiche copies only.

The results of a study are summed up and evaluated of problems related to the possible construction of nuclear heat sources for the Prague conurbation, namely the nuclear power and heat plants in Prague-Holesovice and in Prague-South. Ecological and economic problems are briefly listed which will have to be solved before the nuclear heat sources and the centralized heat supply system are built. (Atomindex citation 09:383587)

INIS-mf-4253 PC **A02**/MF **A01**
Compagnie Generale d'Entreprise Electrique - Alsthom, Levallois-Perret (France).
Computer Aided Design and Management of Cables in a Nuclear Power Plant.
B. Pralus. 1978, 8p CONF-7710184-25
In French.IAEA specialists meeting on the effect of regulatory requirements on nuclear power plant control and instrumentation systems, Madrid, Spain, 4 Oct 1977.
U.S. Sales Only.

Specific problems encountered at both design offices and on-site on management of cables for large nuclear power plants are analyzed. These problems, for a large pert planning, come from safety regulations and quality assurance requirements as well. Emphasis is put on the effect of the QA exigences applicable to the organization and execution of cabling management for nuclear power plants. (Atomindex citation 10:445799)

INIS-mf-4763 PC **A05**/MF **A01**
Statens Vattenfallsverk, Stockholm (Sweden).
Nuclear Power in Rock. Principal Report.
Jun 77, 71p
U.S. Sales Only.

In September 1975 the Swedish Government directed the Swedish State Power Board to study the question of rock-siting nuclear power plants. The study accounted for in this report aims at clarifying the advantages and disadvantages of siting a nuclear power plant in rock, compared to siting on ground level, considering reactor safety, war protection and sabotage. The need for nuclear power production during war situations and the closing down of nuclear power plants after terminated operation are also dealt with. (Atomindex citation 10:437948)

INIS-mf-4778 MF **A01**
Valtion Teknillinen Tutkimuskeskus, Helsinki (Finland).
Risk Benefit Analysis of Site Alternatives for a Nuclear Power Plant Producing Both Electricity and District Heat.
I. Savolainen, and S. Vuori. 1978, 11p CONF-781022-76
Meeting on nuclear power reactor safety, Brussels, Belgium, 16 Oct 1978.
U.S. Sales Only. Microfiche copies only.

The environmental impacts due to radioactive releases in normal operation and accidents are primarily assessed for each site as also the district heat transmission costs. Secondarily the risk components are converted to a compatible form, expressed in monetary units, and compared directly to district heat transmission costs. Annual savings from the shortening of the district heat transmission line are clearly larger than the monetary value given to the expectation of the increased risk. (Atomindex citation 10:446251)

INIS-mf-4809 PC **A02**/MF **A01**
Judgment of 17 March 1978 by the Council of State, Administration Section, IIIrd Chamber.
1978, 7p
In French.
U.S. Sales Only.

On 7 January 1977 the Friends of the Earth Association introduced a petition before the Council of State against the Mayor of the Tihange Commune on whose territory the Intercom Company, intervening party in the case, had begun extension work on the Tihange nuclear power plant. The petition was an appeal against the Mayor's refusal to stop this work authorised by a construction permit issued under the 1962 Town and Country Planning Act, despite the fact that the prior authorisation for nuclear installations required under the 1963 Royal Order had not yet been obtained. The Council of State rejected the petition considering that the two above texts were separate from each other and pursued different objects; the Mayor of Tihange therefore was not empowered, even on the basis of the 1963 Royal Order, to suspend construction work regularly authorised in accordance with the 1962 Act. (Atomindex citation 10:446272)

INIS-mf-5304 MF **A01**
Gemeinschaftskernkraftwerk Neckar G.m.b.H., Neckarwestheim (Germany, F.R.).
Gemeinschafts-Kernkraftwerk Neckar, Unit II. Site and Plant Description in Consideration of Safety Aspects.
Sep 76, 64p
In German.
U.S. Sales Only. Microfiche copies only.

In the brochure, the specific characteristics of the location, the technical construction, and the mode of operation of the planned plant are described. The report deals furthermore with questions of escape and effect of radioactive substances, the cooling tower emission, and other problems interesting for the population which refer to nuclear energy. Possible disturbances in the nuclear power plant and their handling are also dealt with in detail. In order to make the topics, which are partly rather complex, understandable to amateurs also, the different spheres are, as far as necessary, accompanied by explanatory tests. A bibliography at the end of the report gives the interested reader a survey of more detailed literature. The report is to show that the selected location seems appropriate for building and operating the two power plants, as far as the safety of the people living there and their environment is concerned and shows that no disturbances or problems must be expected. All environmental values given refer to GKN I and GKN II. (Atomindex citation 10:491892)

Juel-Spez-12 PC **A07**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Programmgruppe Systemforschung und Technologische Entwicklung.
Contribution to the Standardization of Nuclear Power Plant Siting.
W. Hensel. Jun 78, 135p
In German.Diss.
U.S. Sales Only.

A planning instrument has been developed, with the help of which a test can be made to determine which local and regional sites in the Federal Republic of Germany are still available, after applying a number of siting criteria. Among others, some safety criteria of the Minister of the Interior (Bundesminister des Innern) and some energy management criteria of the Minister for Economic Affairs (Bundesminister fuer Wirtschaft) are put into practice. The regional data bank system presented enables a stepwise process of selection to be carried out. For this, the area of the Federal Republic of Germany is covered by a grid of some 248,000 squares, each of size 1 km x 1 km. The elements of the grid are interrogated according to a number of criteria. As a result, area totals are generated during the course of the selection process. At the same time the position of favourable grid elements is displayed on maps of the Federal Republic of Germany. (Atomindex citation 10:433676)

NUREG/CR-1321 PC **A10**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Systems Interaction Methodology Applications Program.
Final rept. on Phase 1,
Gary J. Boyd, Wallis R. Cramond, Steven W. Hatch, Jack W. Hickman, and Alan M. Kolaczkowski. Apr 80, 205p SAND-80-0384

This report describes a method of reviewing nuclear power plant systems for potential interactions that is independent of the procedures used by the NRC in its Standard Review Plan (NUREG 75-087). The method described is the fault tree method using the Set Equation Transformation System (SETS) computer code for evaluating the

fault trees to identify the potentially interactive cut sets. The report also assesses the Standard Review Plan to show where the potential interactions revealed by this independent method may be specifically discussed in the area of review, review procedures or acceptance criteria of the Standard Review Plan. The analysis for systems interaction presented in this report was restricted to normal plant operating conditions and incidents of moderate frequency as defined by ANS-51/N18.2. The analysis includes potential interactions that may arise because of commonalities of equipment location or physical connections. The report is a contributing element to the resolution of the problem being addressed by Generic Task Action Plan No. A-17 'Systems Interaction in Nuclear Power Plants'.

NUREG-0422-SUP-3 PC **A02**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Construction of McGuire Nuclear Station, Units 1 and 2, Duke Power Company, Supplement No. 3. Docket Nos. 50-369 and 50-370.
Safety evaluation rept.
May 80, 23p
See also Supplement no. 2, PB-292 733.

Supplement No. 3 to the Safety Evaluation Report for Duke Power Company's application for licenses to operate the McGuire Nuclear Station (Docket Nos. 50-369 and 50-370), located in Mecklenburg County, North Carolina has been prepared by the Office of Nuclear Reactor Regulation of the Nuclear Regulatory Commission. The purpose of this Supplement is to describe the generic matters under continuing study. Supplements 1 and 2 updated the Safety Evaluation Report by providing the staff's evaluation of additional information submitted by the applicant since the issuance of the Safety Evaluation Report.

NUREG-0484-REV-1 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Methodology for Combining Dynamic Responses.
Technical rept.,
R. K. Mattu. May 80, 34p
See also PB-287 432.

Procedures in accordance with Appendix A of 10 CFR 50, GDC 2, call for an appropriate combination of the effects of the accident loads and loads caused by natural phenomena (such as earthquakes) to be reflected in the design bases of safety equipment. This requirement of interaction of loads has been implemented in various ways both within the NRC and the Nuclear Industry. An NRR Working Group constituted to examine load combination methodologies developed recommendations which were published in September 1978 as NUREG-0484, (PB-287 432). Revision 1 of NUREG-0484 extends the conclusions of the original NUREG-0484 on the use of SRSS methodology for the combination of SSE and LOCA responses beyond RCPB to any other ASME Section III, Class 1, 2, or 3 affected system, component or support, and provides criteria for the combination of dynamic responses other than SSE and LOCA.

18F. Radiation Shielding and Protection

AAEC-LIB/Trans-670 PC **A05**/MF **A01**
Technische Univ. Muenchen, Garching (Germany, F.R.). Lab. fuer Reaktorregelung und Anlagensicherung.
ZOCO V - A Computer Code for the Calculation of Time-Dependent Spatial Pressure Distribution in Reactor Containments.
G. Mansfeld, and P. Schally. Jun 78, 99p
U.S. Sales Only.

ZOCO V is a computer code which can calculate the time- and space- dependent pressure distribution in containments of water-cooled nuclear power reactors (both full pressure containments and pressure suppression systems) following a loss-of-coolant accident, caused by the rupture of a main coolant or steam pipe. (Atomindex citation 10:441795)

AEEW-R-1157 PC **A02**/MF **A01**
UKAEA, Winfrith (England). Atomic Energy Establishment.
MIXGAM - WRS System Module Number 1300 for Mixing gamma-Ray Cross Sections for Removal Diffusion Calculations.
M. J. Grimstone. Jun 78, 12p
U.S. Sales Only.

The WRS Modular Programming System has been developed as a means by which programmes may be more efficiently constructed, maintained and modified. In this system a module is a self-contained unit typically composed of one or more Fortran routines, and a programme is constructed from a number of such modules. This report describes one WRS module, the function of which is to generate macroscopic cross section sets for specified material compositions for use in gamma-ray diffusion calculations. The information given in this manual is of use both to the programmer wishing to incorporate the module in a programme, and to the user of such a programme. (Atomindex citation 10:426868)

AEEW-R-1159 PC **A02**/MF **A01**
UKAEA, Winfrith (England). Atomic Energy Establishment.
NADCON - WRS System Module Number 23016 for Mixing ADC Method A Data for Neutrons.
M. J. Grimstone. Jun 78, 22p
U.S. Sales Only.

The WRS Modular Programming System has been developed as a means by which programmes may be more efficiently constructed, maintained and modified. In this system a module is a self-contained unit typically composed of one or more Fortran routines, and a programme is constructed from a number of such modules. This report describes one WRS module, the function of which is to calculate multigroup data for use in shielding calculations employing the method of Adjusted Diffusion Coefficients. NADCON prepares macroscopic data for materials of specified compositions by mixing microscopic data from a library supplied with the module. The information given in this manual is of use both to the programmer wishing to incorporate the module in a programme, and to the user of such a programme. (Atomindex citation 10:426869)

AEEW-R-1160 PC **A02**/MF **A01**
UKAEA, Winfrith (England). Atomic Energy Establishment.
REGROUP - WRS System Module Number 13774 for Energy Group Conversion of Flux Spectra.
M. J. Grimstone. Jun 78, 11p
U.S. Sales Only.

The WRS Modular Programming System has been developed as a means by which programmes may be more efficiently constructed, maintained and modified. In this system a module is a self-contained unit typically composed of one or more Fortran routines, and a programme is constructed from a number of such modules. This report describes one WRS module, the function of which is to convert multigroup flux spectra from one energy group scheme to another. The information given in this manual is of use both to the programmer wishing to incorporate the module in a programme, and to the user of such a programme. (Atomindex citation 10:426870)

AEEW-R-834 PC **A02**/MF **A01**
UKAEA, Winfrith (England). Atomic Energy Establishment.
GRAB - WRS System Module Number 60221 for Calculating gamma-Ray Penetration in Slab Shields by the Method of Kernel Integration with Build-Up Factors.
M. J. Grimstone. Jun 78, 19p
U.S. Sales Only.

The WRS Modular Programming System has been developed as a means by which programmes may be more efficiently constructed, maintained and modified. In this system a module is a self-contained unit typically composed of one or more Fortran routines, and a programme is constructed from a number of such modules. This report describes one WRS module, the function of which is to calculate the gamma-ray flux, dose, or heating rate in a slab shield using the build-up factor method. The information given in this manual is of use both to the programmer wishing to incorporate the module in a programme, and to the user of such a programme. (Atomindex citation 10:426864)

AEEW-R-836 PC **A02**/MF **A01**
UKAEA, Winfrith (England). Atomic Energy Establishment.
User's Manual for the REDIFFUSION Programme.
M. J. Grimstone. Jun 78, 21p
U.S. Sales Only.

REDIFFUSION is a programme developed for use in shield design. It carries out calculations of neutron and gamma-ray penetration in one-dimensional geometries using methods based on diffusion theory which provide approximate but rapid solutions. A description of the capabilities of the programme is given together with instructions for its use. (Atomindex citation 10:426865)

AEEW-R-848 PC **A02**/MF **A01**
UKAEA, Winfrith (England). Atomic Energy Establishment.
REMTWO - WRS System Module Number 299 for Calculating the Removal Flux in a Slab Shield.
M. J. Grimstone. Jun 78, 19p
U.S. Sales Only.

The WRS Modular Programming System has been developed as a means by which programmes may be more efficiently constructed, maintained and modified. In this system a module is a self-contained unit typically composed of one or more Fortran routines, and a programme is constructed from a number of such modules. This report describes one WRS module, the function of which is to calculate the uncollided flux due to a distributed source in a one-dimensional plane geometry system. A method is used in which the flux is approximated by the sum of diffusion equation solutions. The information given in this manual is of use both to the programmer wishing to incorporate the module in a programme, and to the user of such a programme. (Atomindex citation 10:426866)

AEEW-R-849 PC **A02**/MF **A01**
UKAEA, Winfrith (England). Atomic Energy Establishment.
SREM - WRS System Module Number 3348 for Calculating the Removal Flux Due to Point, Line or Disc Sources.
M. J. Grimstone. Jun 78, 21p
U.S. Sales Only.

The WRS Modular Programming System has been developed as a means by which programmes may be more efficiently constructed, maintained and modified. In this system a module is a self-contained unit typically composed of one or more Fortran routines, and a programme is constructed from a number of such modules. This report describes one WRS module, the function of which is to calculate the uncollided flux and first-collision source from a disc source in a slab geometry system, a line source at the centre of a cylindrical system or a point source at the centre of a spherical system. The information given in this manual is of use both to the programmer wishing to incorporate the module in a programme, and to the user of such a programme. (Atomindex citation 10:426867)

BARC-1001 MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Multigroup P8 - Elastic Scattering Matrices of Main Reactor Elements.
S. B. Garg, and V. K. Shukla. 1979, 60p
U.S. Sales Only. Microfiche copies only.

To study the effect of anisotropic scattering phenomenon on shielding and neutronics of nuclear reactors multigroup P8-elastic scattering matrices have been generated for H, D, He, exp 6 Li, exp 7 Li, exp 10 B, C, N, O, Na, Cr, Fe, Ni, exp 233 U, exp 235 U, exp 236 U, exp 239 Pu, exp 240 Pu, exp 241 Pu and exp 242 Pu using their angular distribution, Legendre coefficient and elastic scattering cross-section data from the basic ENDF/B library. Two computer codes HSCAT and TRANS have been

developed to complete this task for BESM-6 and CDC-3600 computers. These scattering matrices can be directly used as input to the transport theory codes ANISN and DOT. (Atomindex citation 10:493118)

BARC-1002 MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Multigroup Resonance Self-Shielding Factors and Cross-Sections of Main Reactor Elements.
S. B. Garg. 1979, 158p
U.S. Sales Only. Microfiche copies only.

Multigroup resonance self-shielding factors and cross-sections have been generated for Be, exp 10 B, exp 11 B, C, N, O, Na, Cr, Fe, Ni, Th, exp 233 Pa, exp 233 U, exp 234 U, exp 235 U, exp 238 U, exp 239 Pu, exp 240 Pu, exp 241 Pu and exp 242 Pu using their basic cross-section and resonance parameter data from the ENDF/B library. These cross-sections and self-shielding factors can be directly used in fast reactor codes FCC-IV and 1 DX to study the physics of any dilute or dense fast system representing soft or hard neutron spectrum. The Doppler coefficient of reactivity, vital for safety considerations, can also be estimated using these data. (Atomindex citation 10:493117)

BARC-983 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Range and Energy Functions of Interest in Neutron Dosimetry.
D. P. Bhatia, and P. S. Nagarajan. 1978, 17p
U.S. Sales Only.

This report documents the energy and range functions generated and used in fast neutron interface dosimetry studies. The basic data of stopping power employed are the most recent. The present report covers a number of media mainly air, oxygen, nitrogen, polythene, graphite, bone and tissue, and a number of charged particles, namely protons, alphas, exp 9 Be, exp 11 B, exp 12 C, exp 13 C, exp 14 N and exp 16 O. These functions would be useful for generation of energy and range values for any of the above particles in any of the above media within +- 1% in any dosimetric calculations. (Atomindex citation 10:481445)

CEA-R-4916 PC **A08**/MF **A01**
CEA Centre d'Etudes de Limeil, Villeneuve-Saint-Georges (France).
Finite Element Methods for Static Transport Calculations.
These (3e Cycle),
Jean Gerin-Roze. Aug 78, 170p
In French.
U.S. Sales Only.

Local finite element methods for solving the transport equation are considered. Finite element methods are particularly suited to treat problems with arbitrary-shaped elements and for various flux approximations. In a first step, finite element methods are studied for solving the two-dimensional (x,y) transport equation. The spatial elements chosen are quadrilaterals and the spatial flux is approximated by either continuous or discontinuous polynomials of order one or two. Several test problems in monokinetic theory have been performed. In a second step, the multigroup 'R3Mu1' code has been written for solving the one-dimensional transport equation in spherical geometry (r, mu). Continuous test functions are cubic in r and linear in mu on each element. The results of four test problems indicate that this code provides a valuable alternative to the use of standard finite-difference methods. It is worth while to point out the two main interesting features of these methods: these methods can be applied easily for very complex geometries; one can use various test functions. (Atomindex citation 10:468223)

EFI-260(53)-77 PC **A03**/MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Radiation of Ultrarelativistic Charge with Account Taken of Multiple Scattering.
C. Yang. 1977, 39p
U.S. Sales Only.

A brief theoretical review of characteristics of X-rays and harder radiation formed by an ultrarelativistic charged particle passing through a plate or a stack of plates with regard for multiple scattering and the plate material absorptivity is made. Formulas for frequency- angular and frequency distributions of total radiation in the cases of a plate and of a stack of plates with large spacings as well as a stack of sufficiently thick plates are given. A calculation method for the radiation distributions in a general case of an arbitrary stack is pointed out. The frequency distribution of the total radiation consisting of bremsstrahlung and boundary effects is analyzed in detail. A problem of experimental separation of the boundary effect from the total radiation is discussed. (Atomindex citation 10:468255)

EFI-311(36)-78 PC **A02**/MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Photon Spectrum in Media with Due Regard for Transition Radiation and Cascade Showers.
A. S. Ambartsumyan, and C. Yang. 1978, 10p
In Russian.
U.S. Sales Only.

The spectral distribution of photons generated by a fast charged particle crossing a vacuum--matter interface is studied. Transition radiation and electron-photon showers formed in matter are taken into account. It is shown that showers alter the photon spectrum. Contribution of transition photons to the spectrum is significant for low frequencies. For high frequencies the spectrum has the pure shower nature. (Atomindex citation 10:468012)

EFI-312(37)-78 MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Energy Losses of Ultrarelativistic Electrons in a Diamond Crystal.
A. O. Agan'yants, N. Z. Akopov, Yu. A. Vartanov, and G. A. Vartapetyan. 1978, 10p
In Russian.
U.S. Sales Only. Microfiche copies only.

The energy losses of 4.7 GeV electrons have been studied in a diamond crystal as a function of the incoming angle relative to one of the crystal planes. The experiment was carried out in the internal beam at the Yerevan electron synchrotron using the synchrotron itself as a spectrometer of missing energy of electrons. The ratio of loss probabilities in the range of several tens of MeV turned out to be nearly 10 exp 3 at the average angle of electron incidence THETA=0 and the disorientation of the crystal. The Monte-Carlo simulation of this ratio under the assumption of correction smallness due to the inapplicability of perturbation theory gives an appreciably smaller value. (Atomindex citation 10:468237)

EFI-313(38)-78 PC **A02**/MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Radiation of Ultrarelativistic Electrons in the Oriented Diamond Crystal.
A. O. Agan'yants. 1978, 10p
In Russian.
U.S. Sales Only.

The radiation of 4.7 GeV electrons in a diamond crystal was investigated as a function of the incoming angle relative to one of the crystal planes. The experiment was carried out in the internal electron beam at the Yerevan synchrotron. The total energy flux of gamma quanta was measured by the quantameter in the energy range up to 4.7 GeV. The energy flux at the average incidence angle of electrons THETA=0 proved to be 2.5 times as high as that of the disoriented crystal. Under the same conditions the yield of several tens MeV gamma quanta is more than two orders of magnitude. (Atomindex citation 10:468238)

EFI-334(59)-78 PC **A03**/MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Angular Distribution and Polarization of Electron Bremsstrahlung in Crystal.
S. M. Darbinyan, and K. A. Ispiryan. 1979, 27p
U.S. Sales Only.

The polar and azimuthal angle dependence of the intensity and polarization of high energy electron coherent radiation in crystals is investigated. The differential cross sections for bremsstrahlung in crystal were calculated in the born approximation with exponential screening of the nucleus field by atomic electrons. It is shown that the angular distribution of the bremsstrahlung in crystal differs strongly from that for amorphous media. (Atomindex citation 10:493131)

GRS-S-24 PC **A03**/MF **A01**
Gesellschaft fuer Reaktorsicherheit m.b.H., Cologne (Germany, F.R.).
Emergency Protection in Nuclear Power Plants.
E. Erxleben. Nov 78, 45p
In German.
U.S. Sales Only.

The paper gives a general introduction to the tasks of emergency protection and an extensive survey of the current situation of emergency provision in the FRG. Furthermore, presently running development works for explaining the fundaments and for improving the individual emergency protection measures are described. The accident protection measures necessary for protecting the population in emergency cases must be planned and, at least in the sphere of organisatory preparations, exercised, what leads to dealing with any emergency scenarios. In this connection, accidents with massive escape of radioactive substances are being used as planning tools, as they are also examined regarding the probability of their occurrance and their effects. (Atomindex citation 10:476690)

INIS-mf-4769 PC **A02**/MF **A01**
Rheinisch-Westfaelisches Elektrizitaetswerk A.G, Biblis (Germany, F.R.). Betriebsverwaltung.
Decommissioning Study for Nuclear Power Plants with Lightwater Reactors. First Results.
G. V. P. Watzel, J. Essmann, G. Lukacs, and G. Thalmann. 1978, 9p CONF-781022-72
Meeting on nuclear power reactor safety, Brussels, Belgium, 16 Oct 1978.
U.S. Sales Only.

A study under way concerning decommissioning nuclear power plants with LWR's is reported. The study is ordered by the association of German utilities (VDEW) and performed by Nuclear Ingenieur Service Corp. (NIS). First results concerning radioactivity inventory, amount of wastes, review of techniques, relevant experiences are presented. (Atomindex citation 10:445289)

JAERI-M-7408 PC **A05**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Annual Report on Neutron Scattering Studies in JAERI, July, 1976--June, 1977.
Y. Hamaguchi, M. Iizumi, and Y. Endoh. Nov 77, 90p
U.S. Sales Only.

Neutron scattering studies carried out by Division of Physics, JAERI and by several universities utilizing facilities in Tokai are reported for the period of July, 1976 to June, 1977. The report contains 39 short papers submitted by authors on their individual studies. (Atomindex citation 09:405647)

JAERI-M-7799 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Two-Dimensional Shielding Benchmark Calculations by Discrete Ordinates and Monte Carlo Codes, (1).
Aug 78, 53p
In Japanese.
U.S. Sales Only.

Benchmark calculations were performed to verify the calculational accuracy of Discrete Ordinates and Monte Carlo codes in neutron streaming calculations. The codes used at this time are DOT-III, TWOTRAN-II, PALLAS and MORSE. Two benchmark problems were selected on the basis of experiments made in JRR-4. The first is a problem of fast neutron streaming through a straight cylindrical air duct in water, and the second deals with neutron streaming through an annular air void simulating a gap between pressure vessel and primary shield of a reactor. The neutron spatial distributions have been obtained by activation measurement. Comparisons between calculations and experiments are made on the reaction rate within the duct and void, and also around these spaces. Fairly good agreement is obtained on the whole, but extremely large discrepancies or no convergences appear in a few limited cases. (Atomindex citation 10:481448)

JINR-R-2-11250 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Radiation Slowing-down of Particles Fchanneling in Crystals.
A. G. Bonch-Osmolovskii, and M. I. Podgoretskii. 1978, 13p
In Russian.
U.S. Sales Only.

The motion and the radiation of charged relativistic particles channeled in a crystal are jointly considered. It is shown that, if the initial energy of the particles is sufficiently high, the damping of transverse oscillation of the particles apprecialy differs from exponential. In this case the final energy of the particles (after the damping of transverse oscillations) depends on an initial energy (Esub(K) approximately Esub(H)sup(1/3)) and the intensity and the spectral distribution of the radiation are changed as the particles pass the crystal. (Atomindex citation 09:399553)

KIYI-77-9 PC **A02**/MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Yadernykh Issledovanii.
Application of the Monte-Carlo Method for Calculation of Neutron Cross Sections in the Forbidden Range.
G. M. Novoselov, and V. P. Vertebnyi. 1978, 21p
In Russian.
U.S. Sales Only.

Considered is the application of the Monte-Carlo method for calculation of the average cross sections and transmissions in the forbidden resonance range and for estimation of the strength functions and optical scattering lengths based on the experimental data, obtained on filtered neutron beams. Presented are the dependences of observed Au exp 197 isotope cross sections on the concentration and corresponding calculating magnitudes, obtained by the Monte-Carlo method for a set of parameters: anti D=19.5 eV, anti GITAsub(n)sup(o)=0.007 eV, anti GITAsub(gamma)=0.126 eV, R=0.95x10 exp -12 cm, which corresponds to Ssup(o)=1.90x10 exp 4 strength function where anti D - is an average distance between levels, anti GITAsub(n)sup(o) - is an average reduced neutron width, anti GITAsub(gamma) - is an average radiation width, R - is an amplitude of a potential scattering. (Atomindex citation 10:493269)

LBL-10446 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Range-Energy Program for Relativistic Heavy Ions in the Region 1 < E < 3000 MeV/Amu.
M. H. Salamon. Jan 80, 22p
Contract W-7405-ENG-48

This report describes a computer program (developed for analysis of Bevalac data) that calculates stopping power, range, or energy, and which includes the necessary corrections for accuracy in the high Z sub 1 , beta regime, as discussed in the theoretical and review papers of S.P. Ahlen. The program is also available on PSS at LBL's Computer Center. (ERA citation 05:017131)

NUREG/CR-0930-V-1 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Puncture of Shielded Radioactive Material Shipping Containers: Analysis and Results.
Final technical rept.,
R. A. Larder, and D. F. Arthur. Apr 80, 49p
UCRL/52638

The development of improved analytical methods for predicting puncture of radioactive material shipping containers is reported. 59 static and dynamic puncture tests of lead-backed, uranium-backed, and unbacked flat, circular, stainless steel plates with several mild-steel punch configurations were conducted. It was found that analytical puncture prediction requires two essential elements: (1) a code that will accurately track stress and displacement throughout the event and (2) a criterion for identifying when and if puncture occurs. (The puncture event is not self-evident from the calculation.) The NIKE2D finite element code was coupled with the puncture criteria--a shear stress criterion for the lead-backed plates and a maximum effective plastic strain criterion for the uranium-backed plates; the results agreed very well with the test data.

NUREG/CR-1072 PC **A04**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
A Study of Molten Debris Freezing and Wall Erosion in the RIA-ST-4 Experiment,
Mohamed S. El-Genk, and Richard L. Moore. Apr 80, 58p EGG-2030
Contract DE-AC07-76IDO1570

The safe containment of molten debris following a hypothetical core meltdown accident in a light water reactor depends on the postaccident distribution and freezing of the debris. The objective of the present work is to analyze the freezing of molten debris produced during a severe, in-pile reactivity initiated accident experiment, designated RIA-ST-4. A one-dimensional physical model is developed to study the transient freezing of a molten debris layer deposited on the inner surface of the RIA-ST-4 coolant flow shroud wall and to assess the potential for wall melting upon being contacted by the molten debris. The conditions of finite wall thickness, continuous cooling at the wall outer surface, radiative cooling of the debris, temperature-dependent thermophysical properties, and internal heat generation in the debris are considered in the analysis. The governing equations are solved numerically using a one-dimensional, finite element code.

ORNL/TM-7081 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Post-Accident Cleanup of Radioactivity at the Three Mile Island Nuclear Power Station.
R. E. Brooksbank, and W. J. Armento. Feb 80, 67p
Contract W-7405-ENG-26

The technical staff of the President's Commission on the Accident at Three Mile Island (TMI) requested that Oak Ridge National Laboratory (ORNL) prepare documentation concerned with the cleanup of radioactivity on the Three Mile Island site following the March 28, 1979 accident. The objective of this report is to provide information in a summarized form, which will be of direct usefulness to the commissioners. The information contained herein includes discussion of on-site assistance and accomplishments following the accident, flowsheet development for the TMI recovery team (by the Technical Advisory Group), and the numerous reports already generated on the TMI cleanup and recovery. (ERA citation 05:015746)

PB80-176860 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
SHIELDOSE: A Computer Code for Space-Shielding Radiation Dose Calculations.
Final rept.,
Stephen Seltzer. May 80, 75p NBS-TN-1116
Sponsored in part by Office of Naval Research, Arlington, VA., and National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.

A computer code, SHIELDOSE, has been developed for the calculation of absorbed dose as a function of depth in aluminum shielding material of spacecraft, given the electron and proton fluences encountered in orbit. Absorbed dose, for small volumes of the detector materials Al, H2O, Si, and SiO2, is evaluated in three geometries: (1) in a semi-infinite plane medium; (2) at the transmission surface of a finite-thickness slab; and (3) at the center of a solid sphere. Use of the code is described, and an extensive set of monoenergetic depth-dose data for the various detector materials and geometries is tabulated.

SAND-79-0772 PC **A06**/MF **A01**
Sandia Labs., Albuquerque, NM.
Cross Sections for Electron and Photon Processes Required by Electron-Transport Calculations.
J. M. Peek. Nov 79, 121p
Contract EY-76-C-0789

Electron-transport calculations rely on a large collection of electron-atom and photon-atom cross-section data to represent the response characteristics of the target medium. These basic atomic-physics quantities, and certain qualities derived from them that are now commonly in use, are critically reviewed. Publications appearing after 1978 are not given consideration. Processes involving electron or photon energies less than 1 keV are ignored, while an attempt is made to exhaustively cover the remaining independent parameters and target possibilities. Cases for which data improvements can be made from existing information are identified. Ranges of parameters for which state-of-the-art data are not available are sought out, and recommendations for explicit measurements and/or calculations with presently available tools are presented. An attempt is made to identify the maturity of the atomic-physics data and to predict the possibilities for rapid changes in the quality of the data. Finally, weaknesses in the state-of-the-art atomic-physics data and in the conceptual usage of these data in the context of electron-transport theory are discussed. Brief attempts are made to weight the various aspects of these questions and to suggest possible remedies. (ERA citation 05:017135)

UCRL-15183 PC **A11**/MF **A01**
Sargent and Lundy, Chicago, IL.
Structural Building Response Review.
15 Jan 80, 236p
Contract W-7405-ENG-48

The integrity of a nuclear power plant during a postulated seismic event is required to protect the public against radiation. Therefore, a detailed set of seismic analyses of various structures and equipment is performed while designing a nuclear power plant. This report describes the structural response analysis method, including the structural model, soil-structure interaction as it relates to structural models, methods for seismic structural analysis, numerical integration methods, methods for non-seismic response analysis approaches for various response combinations, structural damping values, nonlinear response, uncertainties in structural properties, and structural response analysis using random properties. The report describes the state-of-the-art in these areas for nuclear power plants. It also details the past studies made at Sargent and Lundy to evaluate different alternatives and the conclusions reached for the specific purposes that those studies were intended. These results were incorporated here because they fall into the general scope of this report. The scope of the present task does not include performing new calculations. (ERA citation 05:015780)

UTNL-R-0057 PC **A02**/MF **A01**
Tokyo Univ. (Japan). Nuclear Engineering Research Lab.
Integral Experiments for the Layers of Iron and Sodium Shields at YAYOI.
Y. Oka, S. Kasai, S. An, S. I. Miyasaka, and K. Koyama. 1978, 8p
U.S. Sales Only.

Integral experiments were performed for two configurations of the layers of iron and sodium shields. Reaction rates were measured with foils and thermoluminescence detectors (TLDs). C/E values were obtained by two-dimensional analysis with TWOTRAN-II code. The effects of weighting spectra on collapsed cross sections were examined. The detector response of exp 197 Au(n, gamma) reaction is most affected by the weighting spectrum in the present study. (Atomindex citation 10:426814)

18G. Radioactive Wastes and Fission Products

AECL-6191 PC **A02**/MF **A01**
Atomic Energy of Canada Ltd., Pinawa (Manitoba). Whiteshell Nuclear Research Establishment.
Canadian Experience with Wet and Dry Fuel Storage Concepts.
S. A. Mayman. Jul 78, 21p
U.S. Sales Only.

Canada has been storing fuel in water-filled pools for 30 years. There have been no significant problems, but until recently little effort has been invested in quantitative assessment of fuel performance under storage conditions. Work is now in progress to provide such information. Storage pools at nuclear generating stations have operated satisfac-

torily. The Canadian nuclear industry has nevertheless been studying methods for reducing storage costs and/or increasing reliability. Various concepts, using both water and air cooling, have been suggested. One such concept - the air-cooled concrete canister - is presently under test at the Whiteshell Nuclear Research Establishment. (Atomindex citation 10:427459)

AED-Conf-77-498-072 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Effluent Release Limits, Sources and Control.
G. E. Swindell. 1977, 13p CONF-7709147-6
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

Objectives of radiation protection in relation to releases are listed together with environmental transfer models for radionuclides. The relationship between releases, environmental levels and doses to persons is discussed The following, release limits are established: limits based on critical population group concept critical pathway analysis and identification of critical group. Limits based on optimization of radiation protection individual dose limits, collective doses and dose commitments. The following topics are also discusse: monitoring of releases to the environment: Objectives of effluent monitoring. Typical sources and composition of effluents; design and operation of monitoring programmes; recording and reporting of monitoring results; complementary environmental monitoring. (Atomindex citation 09:383021)

BARC-1006 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Anion Exchange Separation and Purification of Neodymium from Fission Products.
K. L. Ramkumar, V. A. Raman, P. S. Khodade, and H. C. Jain. 1979, 11p
U.S. Sales Only.

Neodymium-148, the stable fission product has been proved to be one of the best monitors for the determination of nuclear fuel burn-up using triple spike isotope dilution mass spectrometry. For the precise and accurate determination of neodymium it is essential to separate it from bulk of other materials and purify from cerium and samarium which would otherwise cause isobaric interferences. A single stage anion exchange procedure for the separation and purification of neodymium from fission products has been developed. This method supercedes the lengthy and time consuming two stage anion exchange procedure normally used and ensures good chemical yield. (Atomindex citation 10:481715)

CEA-CONF-4045 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Service de Protection contre les Rayonnements.
Experience Acquired in the Evaporation Treatment of Effluents from a Nuclear Research Center.
J. Bourdrez. Apr 77, 13p CONF-7704112-1
In French.Meeting of the working group on the decontamination of sewages in nuclear power plants, Brussels, Belgium, 27 Apr 1977.
U.S. Sales Only.

The treatment of effluents in the Station of the Saclay Center is presented. The mean composition of the effluents and the decontamination factors (results of 40 evaporation runs) are given. The acquired experience enables to conclude that the evaporation process ensures the decontamination of radioactive liquid wastes from research centers with the efficiency needed for releasing them in the limits of the reglementation on waste discharges. (Atomindex citation 10:427410)

CEA-CONF-4190 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Service de Protection contre les Rayonnements.
Solid and Liquid Radioactive Wastes.
J. Cluchet, and J. Desroches. 1977, 42p
In French.
U.S. Sales Only.

The problems raised by the solid and liquid radioactive wastes from the CEA nuclear centres are briefly exposed. The processing methods developed at the Saclay centre are described together with the methods for the wastes from nuclear power plants and reprocessing plants. The different storage techniques used at the La Hague centre are presented. The production of radioactive wastes by laboratories, hospitals and private industry is studied for the sealed sources and the various radioactive substances used in these plants. The cost of the radioactive wastes is analysed: processing, transport, long term storage. (Atomindex citation 10:433961)

CEGB-RD/B/N-4339 PC **A02**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Effect of Load Factor on Fission Product Decay Heat from Discharged Reactor Fuel.
B. S. J. Davies. Jul 78, 5p
U.S. Sales Only.

A sum-of-exponentials expression representing the decay heat power following a burst thermal irradiation of exp 235 U has been used to investigate the effect of load factor during irradiation on subsequent decay heat production. A sequence of random numbers was used to indicate reactor 'on' and 'off' periods for irradiations which continued for a total of 1500 days at power and were followed by 100 days cooling. It was found that for these conditions decay heat is almost proportional to load factor. Estimates of decay heat uncertainty arising from the random irradiation pattern are also given. (Atomindex citation 10:430764)

DOE/ET/47906-2 PC **A04**/MF **A01**
Nuclear Services Corp., Campbell, CA.
Fuel-Clad Failure Detection. Final Report, Task 1.
M. Reier, F. Keneshea, and J. Younger. 16 Nov 79, 63p
Contract AC09-79ET47906

A study has been made of the means of identifying spent nuclear fuel assemblies which have suffered clad rupture. Various probe techniques, such as the use of an ultrasonic probe or boroscope for visual inspection of individual rods, are not feasible because of the inaccessibility of interior rods and the inordinate time consumed in checking a single assembly. The PIXE (Proton Induced X-Ray Emission) method has also been investigated. Although it should produce satisfactory results, it would be far more expensive, without any obvious advantages, than a sipping system for fission products. In-situ sipping of an assembly in a large rack would be extremely desirable; however, unambiguous results cannot be predicted without trying it and comparing with a technique which isolates the assembly from the neighboring ones. Finally, the conceptual design of a sipping system is proposed which is about 2-1/2 times faster than current ones in operation without any loss in accuracy or increased complexity. 5 figures, 7 tables. (ERA citation 05:014923)

DOE/SR-SF-2003 PC **A02**/MF **A01**
Department of Energy, Aiken, SC. Savannah River Operations Office.
Spent Fuel Storage Capacity in New Reactors.
Dec 79, 13p

The standard spent fuel storage pools of the US power reactors currently under construction are sized at about 1000 ft exp 2 and 1225 ft exp 2 for BWR and PWR respectively. These basins, when equipped with SS racks, will contain 11 and 13 years fuel discharge respectively, each with full core reserve. With densification by fuel pin disassembly and reassembly into light SS cans, their capacity can be increased to 19 and 27 years respctively. With moderately expanded basin size, estimated to cost $3.0 and $1.6 million, and with boron SS basin racks, estimated to cost $2.5 and $1.0 million for BWR and PWR respectively, the basin capacities could be expanded to handle 20 years of reactor discharge. With fuel rod reassembly, the capacity of these basins would increase to 40 years or full reactor lifetime discharge. Utilities will move toward these moderately expanded size basins. (ERA citation 05:014925)

EUR-5901 PC **A10**/MF **A01**
Commission of the European Communities, Ispra (Italy). Joint Research Centre.
Safety Assessment of Radioactive Waste Disposal into Geological Formations; a Preliminary Application of Fault Tree Analysis to Salt Deposits.
B. Bertozzi, M. D'Alessandro, F. Girardi, and M. Vanossi. 1978, 201p
U.S. Sales Only.

The methodology of the fault tree analysis (FTA) has been widely used at the Joint Research Centre of Ispra in nuclear reactor safety studies. The aim of the present work consisted in studying the applicability of this methodology to geological repositories of radioactive wastes, including criteria and approaches for the quantification of probalities of primary events. The present work has just an illustrative purpose. Two ideal cases of saline formations, I.E. a bedded salt and a diapir were chosen as potential disposal sites for radioactive waste. On the basis of arbitrarily assumed hydrogeological features of the salt formations and their surrounding environment, possible phenomena capable of causing the waste to be released from each formation have been discussed and gathered following the logical schemes of the FTA. The assessment of probability values for release events due to natural causes as well as to human actions, over different time periods, up to one million years, has been discussed. (Atomindex citation 10:427440)

EUR-5902 PC **A03**/MF **A01**
Commission of the European Communities, Ispra (Italy). Joint Research Centre.
Long-Term Risk Assessment of Radioactive Waste Disposal in Geological Formations.
F. Girardi, G. Bertozzi, and M. D'Alessandro. 1978, 42p
U.S. Sales Only.

Methods for long-term safety analysis of waste from nuclear power production in the European Community are under study at the Joint Research Centre (JRC) at Ispra, Italy. Aim of the work is to develop a suitable methodology for long-term risk assessment. The methodology under study is based on the assessment of the quantitative value of a system of barriers which may be interposed between waste and man. The barriers considered are: a) quality of the segregation afforded by the geological formation, b) chemical and physical stability of conditioned waste, c) interaction with geological environments (subsoil retention), d) distribution in the biosphere. The methodology is presently being applied to idealized test cases based on the following assumptions: waste are generated during 30 years of operations in a nuclear park (reprocessing + refabrication plant) capable of treating 1000 ton/yr of LWR fuel. High activity waste is conditioned as borosilicate glass (HAW) while low- and medium-level wastes are bituminized (BIP). All waste is disposed off into a salt formation. Transport to the biosphere, following the containment failure occurs by groundwater, with no delay due to retention on adsorbing media. Distribution into the biosphere occurs according to the terrestrial model indicated. Under these assumptions, information was drawn concerning environmental contamination, its levels, contributing elements and pathways to man. (Atomindex citation 10:427450)

FR-TR-29 PC **A02**/MF **A01**
Ministry of Agriculture, Fisheries and Food, Lowestoft (UK). Fisheries Radiobiological Lab.
Simple Model for the Dispersion of Radioactive Wastes Dumped on the Deep-Sea Bed.
J. G. Shepherd. 1976, 19p
U.S. Sales Only.

A simple model has been developed for the dispersion of radioactive materials in a closed and finite ocean. It allows for the simultaneous action of both diffusion and horizontal (but not vertical) advection, and thus avoids the major limitations of previous models. It is sufficiently versatile to handle non-Fickian diffusion and radioactive decay, but requires numerical integration using some semi-empirical form for the Green function of diffusion from a point source. The model has been used to estimate equilibrium concentrations of radioactive materials in sea water arising from the continuous release of material from a dump on the bottom of the deep ocean, using parameters appropriate for the North Atlantic. It is found that except under rather extreme conditions the surface concentra-

tions do not exceed the long-term average value which would be established in a perfectly mixed ocean. The concentrations are also rather insensitive to the values of the diffusion and advection parameters used, except for that for vertical diffusion, but depend strongly on the overall removal rate of material from the ocean, including processes other than radioactive decay. It is suggested that safety assessments of deep-sea dumping should utilize estimates of the environmental capacities of the oceans based on the long-term 'well-mixed' average concentrations (which are very easily calculated) using a safety factor of no more than ten to allow for the possible effects of pluming and upwelling. (Atomindex citation 10:433973)

INIS-mf-4460 PC **A06**/MF **A01**
Kaernbraenslesaekerhet, Stockholm (Sweden).
Handling of Spent Nuclear Fuel and Final Storage of Vitrified High Level Reprocessing Waste. 4. Safety Analysis.
1978, 115p
U.S. Sales Only.

The report is a safety analysis on the management of high-level radioactive waste from reprocessing of spent fuel. The work is part of the Swedish KBS-project. Handling, storage and transport will be done in accordance with international and national rules. Management and storing of vitrified high-level waste will be done according to the principals tested in the Marconle plant in France. The probability of the most severe accident, a ship collision with fire, is calculated to 3 . 10 exp -6 per year. If this will occur near a big city the maximal collective dose is about 30 000 manrem. This means that a maximum risk of 6 cases of radiation induced cancer occurs. For the most severe case concerning final disposal, a deep-well with drink water near the final storage, the individual dose is calculated to increase in the future by mostly 0.4 rem for 30 years, which will be reached after about 200 000 years. This is less than the variations of the natural radiation. (Atomindex citation 09:408911)

INIS-mf-4538 MF **A01**
Instituto Politecnico Nacional, Mexico City. Escuela Superior de Fisica y Matematicas.
Safety Evaluation of Liquid Radioactive Effluents Treatment System in a BWR Reactor, Through the LIQM03 Code.
Thesis (M.Sc.),
S. H. Zorrilla R. 1978, 249p
In Spanish.
U.S. Sales Only. Microfiche copies only.

In this work we made a safety evaluation of the liquid radioactive effluents system in a plant using a BWR similar to that now installed in Laguna Verde. For that purpose, the computation program ORIGENwas modified, in order to keep up to date and adapt it to the PDP 10 computer, which is operating at the Computation Department of the Nuclear Center of Mexico, the code LIQM03 was the result of this modification. As usual in this work we dealt with problems which were solved opportunely, now we have at our disposal the code LIQM03 which will be in the future a very useful tool for this kind of evaluations. (Atomindex citation 10:426630)

INIS-mf-4569 PC **A18**/MF **A01**
Deutsche Gesellschaft fuer Wiederaufarbeitung von Kernbrennstoffen m.b.H. Hanover (Germany, F.R.).
Report on the Fuel Cycle Centre for Spent Fuel Elements from Nuclear Power Plants in the Federal Republic of Germany.
1977, 324p
In German.
U.S. Sales Only.

The report takes into account the contents of the safety report which was presented on March 31st, 1977 to the Social Minister of Lower Saxony by the Deutsche Gesellschaft fuer Wiederaufbereitung von Kernbrennstoffen mbH, Hanover, together with the application for a licence for the construction and operation of a fuel cycle centre. However, the report is not to be seen as the brief description of the facility, as it is required according to section 3, sub-section 3 of the AtVfV (Nuclear Installations Ordinance). It is more introductory information. Statements and drafts are preliminary; they have neither been decided on nor have they been licensed. However, the report gives a survey of the present state-of-the-art and of planning activities concerning the nuclear fuel cycle centre, while paying special attention to data relevant to the site. The government of Lower Saxony has proposed as a preliminary site on Febr. 22nd, 1977 an area near Gorleben in the rural district of Luechow-Dannenberg. The Federal government has adopted this proposal on July 5th, 1977. (Atomindex citation 10:436516)

JAERI-M-7642 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Study on Safety Ground Storage and Disposal of Radioactive Wastes. Distribution and Migration of exp 60 Co and exp 137 Cs in a Sand Layer.
S. Takebe, H. Matsuzuru, and Y. Wadachi. Apr 78, 15p
In Japanese.
U.S. Sales Only.

In evaluation of radionuclides migration through aerated zone, distribution ratio and migration rate of exp 60 Co and exp 137 Cs in a sand layer were examined under different conditions. Radioactive aqueous solutions exp 60 Co and exp 137 Cs were allowed to flow down to an aerated sand layer in a column. The distribution coefficient of both exp 60 Co and exp 137 Cs is large in acidic, and small in neutral and alkaline condition. Distribution ratios show exp 60 Co and exp 137 Cs deposit mostly at surface of the sand layer independent of the solution acidity. By the equation proposed by Inoue et al., migration rate of exp 60 Co and exp 137 Cs is large in both neutral and alkaline condition, but small compared with that of water. (Atomindex citation 10:426087)

JAERI-M-7936 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Leaching of Tritium from a Cement Composite.
Hideo Matsuzuru, and Akihiko Ito. Oct 78, 17p
In Japanese.
U.S. Sales Only.

Leaching of tritium from cement composites into an aqueous phase has been studied to evaluate the safety of incorporation of the tritiated liquid waste into cement. Leaching tests were performed by the method recommended by the International Atomic Energy Agency. The Leaching fraction was measured as functions of waste-cement ratio (Wa/C), temperature of leachant and curing time. The tritium leachability of cement in the long term test follows the order: alumina cement portland cement slag cement. The fraction of tritium leached increases with increasing Wa/C and temperature and decreasing curing period. A deionized water as a leachant gives a slightly higher leachability than synthetic sea water. The amount leached of tritium from a 200 l drum size specimen was estimated on the basis of the above results. (Atomindex citation 10:481679)

KBS-TR-111 PC **A06**/MF **A01**
Kaernbraenslesaekerhet, Stockholm (Sweden).
Radionuclide Inventories in Spent Fuel from LWR and in High-Level Waste from Plutonium Recycle in PWR.
N. Kjellbert. Jul 78, 104p STUDSVIK-SM-78/25
In Swedish.
U.S. Sales Only.

An investigation of the importance of physical simplification in the ORIGEN code has been made by comparison with the BEGAFIP and CASMO codes. The most significant discrepancy seems to be due to the ORIGEN overestimation of the self-shielding effect on the neutron capture resonance integral of plutonium-240. This leads to an underestimation of the inventories of heavy nuclides with masses 241 through 246. In connection with the investigation, a recalculation of earlier presented inventories in spent fuel has been made, including studies of helium pressure build-up due to alpha decay, and neutron-induced activity in fuel rod construction materials. A rough estimation of plutonium recycle impact on radionuclide inventories in high-level waste has also been made. It is shown that recycling will have no dramatic effects on the inventories of radiologically significant nuclides. (Atomindex citation 10:441819)

KBS-TR-112 PC **A03**/MF **A01**
Kaernbraenslesaekerhet, Stockholm (Sweden).
Safety Analysis of the Encapsulation of Irradiated Fuel Elements in Copper Containers.
E. Nordesjoe. Mar 78, 45p
In Swedish.
U.S. Sales Only.

In the encapsulationsplant the irradiated fuel will be encapsulated in a copper container before delivery to the final underground waste disposal. In this report the process for encapsulation is described and an analysis of offsite radiological consequences both for yearly normal activity discharges and from unlikely accidents is performed. From the report it is concluded that the radiological effects will be very small, less than 10 exp -4 mrem/year to surrounding people from normal operation. Even at extremely unlikely accidents, the individual doses will be negligably small. It is further concluded that the transport down to the final underground waste disposal can be performed in a safe manner. Even considering a total failure in the transport device down to the wastedisposal, significant damages on the capsul can be avoided with a special design of the transportshaft. (Atomindex citation 10:431016)

KBS-TR-12 PC **A08**/MF **A01**
Kaernbraenslesaekerhet, Stockholm (Sweden).
Judgement of Properties and Function of Concrete in Connection with Final Disposal of Nuclear Fuel Wastes in Rock.
S. G. Bergstroem, G. Fagerlund, and L. Romben. Jun 77, 162p
In Swedish.
U.S. Sales Only.

This report deals with the possibility of using concrete in conjuction with the permanent storage of nuclear fuel waste in rock storage facilities. The emphasis has been placed on properties such as strength and tightness and how these may be affected by internal and external causes of destruction during a filling stage of approximately 100 years and during the final storage stage of 1 000 - 100 000 years. It is established that spontaneous structural changes, which lead to a certain increase in porosity, cannot be precluded during the filling stage and uring the final storage stage. It is deemed possible to avoid cracking during the manufacture and during the filling stage if the concrete is kept moist. The risk for cracking during the final storage stage is difficult to assess. Attempts are made to estimate the tightness of aged concrete during the various stages. The tightness during the final storage stage is difficult to assess due to the fact that the scope of the cracking cannot be estimated. Chemical attacks during the filling stage are deemed to be small and can be repaired. The risk for destruction due to radioactive radiation is extremely small. Reinforcement, if any, can be protected during the filling stage on condition that the concrete is kep saturated but all reinforcement will be destroyed during the final storage stage. By way of conclusion, a number of general views on the choice of concrete and work methods are provided. (Atomindex citation 10:431022)

KBS-TR-32 MF **A01**
Kaernbraenslesaekerhet, Stockholm (Sweden).
Long Term Mineralogical Properties of Bentonite/Quartz Buffer Substance.
A. Jacobsson, and R. Pusch. Jun 78, 158p
In Swedish.
U.S. Sales Only. Microfiche copies only.

This report shows results from investigations concerning properties in bentonitebased buffersubstances which are suggested to be used when high level radioactive wastes from nuclear powerplants are to be stored finally. Recommended material characteristica of the bentonite to be used are summerized. In an attempt to find geological evidence for bentonite to loose its desireable properties there were no such findings at the temperatures, groundwater situations and pressures which are to be expected at the actual depositing depth (500 m) for a considerable period of time. Concerning biological activity and then specially the mobility and activity of bacteria the conclusion is that there will be little or no influence from them either there is bentonite-sand or compacted pure bentonite in the buffer mass. (Atomindex citation 10:431037)

KBS-TR-54-03 PC **A06**/MF **A01**
Kaernbraenslesaekerhet, Stockholm (Sweden).

Groundwater Movements around a Repository. Regional Groundwater Analyses. Part 1. Initial Conditions. Part 2. Long Term Residual Conditions.
A. Burgess. Oct 77, 116p
U.S. Sales Only.

Based on regional models of groundwater flow, the regional hydraulic gradient at depth is equal to the regional topographic gradient. As a result, the equipotentials are near vertical. The permeability distribution with depth influences the groundwater flow patterns. A zone of sluggish flows, the quiescent zone is developed when the permeability decreases with depth. This feature is accentuated when horizontal anisotropy, with the horizontal permeability higher then the vertical permeability, is included. The presence of an inactive zone will be a prerequesite for a satisfactory repository site. The effect of an inclined discontinuity representing a singular geological feature such as a fault plane or shear zone has been modelled. The quiescent zone does not appear to be unduly disturbed by such a feature. However, meaningful quantitative predictions related to the flows in a typical singular feature cannot be made without more specific data on their hydraulic properties. Two dimensional analysis has been made for a site specific section of a candidate repository site at Forsmark, Sweden. The lateral extent of the model was defined by major tectonic features, assumed vertical. Potential gradients and pore velocities have been computed for a range of boundary conditions and assumed material properties. The potential gradients for the model with anisotropic permeability approach the average potential gradient between the boundaries. The result of this study of the initial groundwater conditions will be used as input data for the analyses of the thermomechanical perturbations of the groundwater regime. In the long term, the groundwater flow will return to the initial conditions. The residual effects of the repository on the flow will be discussed in part 2 of this report. (Atomindex citation 10:431025)

KBS-TR-55 PC **A04**/MF **A01**
Kaernbraenslesaekerhet, Stockholm (Sweden).
Sorption of Long-Lived Radionuclides in Clay and Rock. Part 1. Determination of Distribution Coefficients. Part 2. Literature Examination.
B. Allard, H. Kipatsi, and J. Rydberg. Oct 77, 51p
In Swedish.
U.S. Sales Only.

The mechanism of sorption of water soluble species in the natural environment has been discussed. The radiochemical and radiobiological properties of the elements in spent nuclear fuel have been briefly discussed, and 14 of the radioactive products have been selected for studies of the sorption behaviour in contact with natural rock and clay minerals. These 14 elements are Sr, Zr, Tc, I, Cs, Ce, Nd, Eu, Ra, Th, U, Np, Pu and Am. From data available concerning composition and equilibria in natural subsoil waters two standard water compositions have been suggested for the laboratory measurements. Suitable concentrations of the radionuclides and experimental temperatures have been proposed. A batch technique has been used for determination of distribution coefficients for powdered solid materials. Measurements have been performed for all of the 14 elements with granite and bentonite/quartz mixture (10:90) with variation of water composition, nuclide concentration and temperature. Moreover, the effect of variation of the particle size has been studied for granite with Sr, Cs and Am, as well as the sorption in powdered granodiorite, chlorite and silt and on fresh and old rock surfaces (granite). The presence of organic components in bentonite has been confirmed and a preliminary complex formation study with these organics has been performed. An estimation of the valencestate of the actinides U, Np and Pu has been suggested using reasonable assumptions regarding the hydrolysis of the actinides and the presence of Fe(IIE/Fe(IE in natural waters. Using measured or calculated distribution coefficients and considering the chemical properties of the natural water system, relevant retention factors of the radionuclides have been proposed. (Atomindex citation 10:431020)

KBS-TR-56 PC **A02**/MF **A01**
Kaernbraenslesaekerhet, Stockholm (Sweden).
Radiolysis of Buffer Materials.
B. Allard, H. Kipatsi, and J. Rydberg. Oct 77, 22p
In Swedish.
U.S. Sales Only.

The effect of gamma irradiation on the properties of the possible buffer material bentonite (bentonite:quartz, 10:90) has been discussed, mainly in qualitative terms. Changes in ion exchange properties and lattice structure of the clay mixture due to irradiation in an aqueous solution have been studied. The production of gas (hydrogen) due to radiolysis has been determined as a function of the radiation dose. The resistance to corrosion of titanium in a radiation field has been demonstrated. (Atomindex citation 10:431019)

KBS-TR-77 PC **A05**/MF **A01**
Kaernbraenslesaekerhet, Stockholm (Sweden).
Nuclide Migration from a Bedrock Repository for Spent Fuel.
B. Grundfelt. Aug 78, 88p
In Swedish.
U.S. Sales Only.

A study of the migration of radionuclides from a repository for spent, unprocessed fuel is presented. The study makes use of a unidimensional dispersion model developed at BNWL. The results show that a number of nuclides decay significantly during the migration. The doses to future man was calculated in a separate study performed at Studsvik. The dose calculations are based on the activity in-flows, presented in this report, and show that the predominant dose contribution comes from the nuclide radium-226. This nuclide is formed mainly by the decay of uranium-238 which means that the main part of the dose would arise even from a repository for non-irradiated fuel. (Atomindex citation 10:431031)

KBS-TR-83 PC **A03**/MF **A01**
Kaernbraenslesaekerhet, Stockholm (Sweden).
Handling of Canisters with Spent Fuel in the Final Repository.
A. Engelbrektsson. Apr 78, 27p
In Swedish.
U.S. Sales Only.

accordance with the project for the final storage of non-reprocessed spent nuclear fuel, the waste will be encapsulated into copper canisters which will be deposited in a final repository located in rock 500 m below ground level. The canisters will be placed in vertical holes in the bottom of the tunnels, where the copper cylinders will be surrounded by blocks of highly compacted bentonite. The purpose of this report is to describe the transport of the fuel canisters from the encapsulation plant above ground level and the handling of the canisisters until they are finally placed in their depositioning holes. The design of the transport system is based upon the basic principles that a complete radiation protection shall be provided during normal operations in the tunnels and that no radioactive emission or radiation protection problems should arise in consequence of transport accidents etc. Possible accident situations have been analysed. (Atomindex citation 10:431030)

KBS-TR-84 PC **A05**/MF **A01**
Kaernbraenslesaekerhet, Stockholm (Sweden).
Fabrication and Handling of Bentonite Blocks.
Jun 78, 95p
In Swedish.
U.S. Sales Only.

In accordance with the project for the final storage of spent nuclear fuel, the waste will be encapsulated into copper canisters, which will be deposited in a final repository located in rock 500 m below ground level. The canisters will be placed in vertical holes in the bottoms of the tunnels, where the copper cylinders will be surrounded by blocks of highly compacted bentonite. When the blocks are saturated with water and expansion is essentially retained as in the actual case, a very high swelling pressure will arise. The bentonite will be extremely impermeable and thus it will form a barrier against transport of corrosive matters to the canister. The blocks are fabricated by means of cold isostatic pressing of bentonite powder. The base material in the form of powder is enclosed in flexible forms, which are introduced into pressure vessels where the forms are surrounded by oil or water. Thus the powder is compacted into rigid bodies with a bulk density of about 2.2 t/m exp 3 for "air dry" bentonite, which might be compared with a specific density of about 2.7 t/m exp 3 . The placing of a canister is preceded by piling up bentonite blocks to a level just below the canister lid position, after which the slot around the blocks is filled with bentonite powder. The rest of the blocks are mounted after filling bentonite powder into the inner slot around the canister as well. Finally the storage tunnels will be sealed by filling them with a mixture o02067NRM 0000181 45. (Atomindex citation 10:431039)

KBS-TR-96 PC **A03**/MF **A01**
Kaernbraenslesaekerhet, Stockholm (Sweden).
Corrosion Testing of Unalloyed Titanium in Simulated Disposal Environments for Reprocessed Nuclear Waste.
S. Henrikson, and M. de Pourbaix. Apr 78, 48p
In Swedish.
U.S. Sales Only.

On the commission of the Nuclear Safety Project (KBS) corrosion tests have been carried out on unalloyed titanium, which is planned to be used as an outer corrosion resistant canister for reprocessed nuclear waste. The corrosive medium was modified Baltic water at 100 and 130 deg C with either a high (8 ppm) or a low (>10 ppb) oxygen content. The total duration of the tests was 300 days. Very low oxidation rates (<0.1 micron/year) were obtained, corresponding to a life time of ten thousands of years for a 6 mm thick titanium canister. In spite of the considerably accelerated corrosive conditions, compared with those estimated for the final disposal, no signs of localized corrosion were found, nor could any hydrogen pick-up be detected. (Atomindex citation 10:431032)

KBS-TR-99 MF **A01**
Kaernbraenslesaekerhet, Stockholm (Sweden).
Leaching of Active French Glasses at Studsvik: Progress Report 1978-06-01.
G. Blomqvist. Jun 78, 61p
In Swedish.
U.S. Sales Only. Microfiche copies only.

The leaching of highly active French glasses at Studsvik, which have been described earlier, have continued. This report gives analytical data up to 1978-04-03. LWR glasses containing Cs and Sr show considerable difference in the beginning which tend to diminish during stage 5. Observed leach rates are 1-2 x 10 exp -6 g cm exp -2 day exp -1 at the end of observations. They have a tendency to decrease futher. Increase in temperature from 25 deg C to 60 deg C gave a leach rate increase with a factor of about 10. In all cases but one the leach rate at 60 deg C decreased considerabley with time. For Pu, the leach rate remained approximately constant at 5 x 10 exp -7 g cm exp -2 day exp -1 during stages 1 - 3 and beginning of stage 5. After a few weeks of that stage there was a temporary strong increased of Pu leaching, that decayed back to about 5 x 10 exp -6 g cm exp -2 day after about a month. This effect is still unexplained but may be due to inhomogenity. (Atomindex citation 10:431023)

KFK-2833 PC **A03**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik.
Fuel Handling, Reprocessing, and Waste and Related Nuclear Data Aspects.
H. Kuesters, M. Lalovic, and H. W. Wiese. Jun 79, 31p CONF-780921-14, PWA-81/78
Conference on neutron physics and other applied purposes, Harwell, UK, 25 Sep 1978.
U.S. Sales Only.

The essential processes in the out-of-pile nuclear fuel cycle are described, i.e. mining and milling of uranium ores, enrichment, fuel fabrication, storage, transportation, reprocessing of irradiated fuel, waste treatment and waste disposal. The aspects of radiation (mainly gammas and neutrons) and of heat production, as well as special safety considerations are outlined with respect to their potential operational impacts and long-term hazards. In this context the importance of nuclear data for the out-of-pile fuel cycle is discussed. Special weight is given to the LWR fuel cycle including recycling; the differences of LMFBR high burn-up fuel with large PuO sub 2 content are described. The HTR fuel cycle is discussed briefly as well as some alterna-

tive fuel cycle concepts. (Atomindex citation 10:493853)

KURRI-TR-163 PC **A02**/MF **A01**
Kyoto Univ., Osaka (Japan). Research Reactor Inst.
Management of Radioactive Liquid and Solid Wastes at the Research Reactor Institute, Kyoto University, (3).
T. Tsutsui, K. Shimoura, and A. Koyama. Nov 77, 12p
In Japanese.
U.S. Sales Only.

In this report, the management of radioactive liquid and solid wastes at the Research Reactor Institute, Kyoto University during past 6 years, from April in 1971 to March in 1977 are reviewed. (Atomindex citation 10:427434)

ND-R-250(D) PC **A02**/MF **A01**
UKAEA, Dounreay (Scotland). Nuclear Power Development Establishment.
Application of the Harwell Neutron Absorptiometer to the Analysis of U-235 in Nuclear Fuel Components.
T. L. Jones, J. Watson, and T. A. H. Taylor. May 79, 12p
U.S. Sales Only.

This paper describes the application of the Harwell Neutron Absorptiometer to routine analysis of the U-235 content of fuel element inserts manufactured at the Dounreay Nuclear Power Development Establishment for the use in Materials Testing Reactors. The instrument response, which is principally dependent on the exp 235 U closely follows a logarithmic relationship. Neutron attenuation due to the aluminium matrix and the presence of exp 238 U is less than 2% of the total attenuation. The absorptiometer can be used to estimate the weight of exp 235 U in a single insert with a total error in the range 1 to 1.6%. (Atomindex citation 10:493505)

NUREG/CR-1397 PC **A07**/MF **A01**
Sandia Labs., Albuquerque, NM.
Risk Methodology for Geologic Disposal of Radioactive Waste: Small Sample Sensitivity Analysis Techniques for Computer Models, with an Application to Risk Assessment,
Ronald L. Iman, W. J. Conover, and James E. Campbell. May 80, 133p SAND-80-0020
Prepared in cooperation with Texas Tech Univ., Lubbock. Coll. of Business Administration.

As modeling efforts expand to a broader spectrum of areas the amount of computer time required to exercise the corresponding computer codes has become quite costly. This costly process can be directly tied to the complexity of the modeling, which makes the relationships among the input variables not mathematically tractable. In this setting it is desired to perform sensitivity studies of the input-output relationships. A variety of situations require that decisions and judgments be made in the face of uncertainty, such as lack of knowledge about probability distributions associated with input variables, different hypothesized future conditions, or different strategies associated with a decision making process. In this paper a generalization of Latin hypercube sampling is given that allows these areas to be investigated without making additional computer runs.

ORNL/TM-7024 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Possibility of Multiple Temperature Maxima in Geologic Repositories for Spent Fuel from Nuclear Reactors.
S. W. Beyerlein, and H. C. Claiborne. Jan 80, 42p
Contract W-7405-ENG-26

Heat transfer studies show that two temperature maxima at the disposal horizon could be experienced in CANDU spent fuel repositories - one at about 60 years and another slightly higher one at 13,000 years. Because CANDU spent fuels display a monotonically decreasing heat generation rate, it is not immediately obvious why this behavior should occur. This report investigates this behavior, confirms the Canadian results, demonstrates that the double peak phenomenon is due to the presence of the right mixture of short- and long-lived nuclides in the fuel, and concludes that the 13,000-year maximum is largely an artifact of the infinite or very large plane source model. When more realistic repository geometries are used, the second peak disappears for repository sizes less than about 1 km exp 2 . Over the long term, radial and surface heat transfer causes the thermal history of the disposal region to deviate from that predicted by infinite plane (or large finite) source models by reducing the magnitude of the second peak. Beyond a 1000-year time horizon, care should be exercised in modeling spent fuel repositories to include the proper boundary conditions. For the first few centuries after emplacement, however, the infinite source model is consistent with the finite disk source model as well as with arrays of spherical and point sources. The second temperature peak can be avoided by restricting the size of the repository and/or partitioning out the long-lived components of the fuel. When spent fuel from PWRs was examined for multiple temperature maxima, only one peak was found, even for the infinite plane source model. (ERA citation 05:014929)

PB80-178700 PC **A06**/MF **A01**
Council of State Governments, Lexington, KY.
States' Role in Radioactive Material Management,
Edward Helminski, and Joanna Mack. May 75, 110p NSF/RA/G-75-026
Proceedings of a workshop held December 9-11, 1974, Las Vegas, NV.

This report contains papers presented at a workshop of state and Federal policy-makers on radioactive material management, with special attention to the transportation of nuclear waste material. Recent accidents in handling and transporting low-level radioactive materials point out the need to develop and enforce stringent regulations. In addition, jurisdictional responsibilities and roles of various Federal and state agencies require delineation. Papers deal with several aspects of material waste handling: Federal regulatory programs; the role of the Atomic Energy Commission; state programs enacted in New York and Louisiana; the disposal of high-level nuclear wastes with respect to state input; and the need for a national program to dispose of commercial transuranic radioactive wastes. The future role of states in the management and disposal of radioactive materials is also considered. Appendices include a list of workshop program speakers, an attendance list, and a bibliography.

PB80-180656 PC **A03**/MF **A01**
Teknekron Research, Inc., McLean, VA.
Transportation Issues Regarding Low-Level Nuclear Waste,
Richard Milstein, and Douglas K. Vogt. Jun 79, 34p DOT-P-10-79-25
Contract DOT-OS-90072

The purpose of the report was to review the status of low-level waste (LLW) management and to identify associated transportation issues and problems for further analysis. The report presents projections of annual amounts of government and commercial (both fuel cycle and non-fuel cycle) LLW. It then describes the present status of waste disposal at the three existing burial grounds: Barnwell, SC, Beatty, NV, and Hanford, WA. Using a waste allocation model developed by Teknekron, the authors assess the transportation effects of regional constraints on LLW management through three scenarios. Case A assumes the status quo, with a restriction on receipt of wastes at Barnwell continuing indefinitely. Case B assumes a new site in the Northeast opens in 1985. Case C assumes that administrative restriction on Barnwell is lifted. The authors point out that the other scenarios are possible.

PNCT-841-78-09 PC **A02**/MF **A01**
Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan).
Developments in the Treatment of Solid alpha-Bearing Wastes at the PNC Plutonium Fuel Facilities.
K. Ohtsuka, H. Miyo, J. Ohuchi, K. Shiga, and T. Muto. Jan 78, 15p
U.S. Sales Only.

Some results of experiments done in PNC are presented on volume reduction technics for alpha-bearing wastes. A pilot wood milling machine automatically mills the plywood frames of nipple connected HEPA filters, which result in fine sized wooden chips, two nipples and the filter components. The filter components are melted in an induction furnace to be homogeneous solids. These methods and incineration of wooden chips reduce the stored volume of HEPA filters to 1/50 – 1/100. PVC and neoprene rubber are decomposed in concentrated sulfuric acid, followed by oxidation with nitric acid. The acid digestion process generates chlorine-rich gas, from which only chlorine is selectively absorbed in water. An alpha-bearing vessel and a glovebox are cut at their installed places without spread of plutonium contamination outside the greenhouses. (Atomindex citation 10:427427)

PNL-2851 PC **A09**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Summary of FY-1978 Consultation Input for Scenario Methodology Development.
B. L. Scott, G. L. Benson, R. A. Craig, and M. A. Harwell. Nov 79, 180p
Contract EY-76-C-06-1830

The Scenario Methodology Development task is concerned with evaluating the geologic system surrounding an underground repository and describing the phenomena (volcanic, seismic, meteorite, hydrologic, tectonic, climate, etc.) which could perturb the system and possibly cause loss of repository integrity. This document includes 14 individual papers. Separate abstracts were prepared for all 14 papers. (ERA citation 05:014970)

PNL-3160-2 PC **A08**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Assessment of Effectiveness of Geologic Isolation Systems. Variable Thickness Transient Ground-Water Flow Model. Volume 2. Users' Manual.
A. E. Reisenauer. Dec 79, 157p
Contract EY-76-C-06-1830

A system of computer codes to aid in the preparation and evaluation of ground-water model input, as well as in the computer codes and auxillary programs developed and adapted for use in modeling major ground-water aquifers is described. The ground-water model is interactive, rather than a batch-type model. Interactive models have been demonstrated to be superior to batch in the ground-water field. For example, looking through reams of numerical lists can be avoided with the much superior graphical output forms or summary type numerical output. The system of computer codes permits the flexibility to develop rapidly the model-required data files from engineering data and geologic maps, as well as efficiently manipulating the voluminous data generated. Central to these codes is the Ground-water Model, which given the boundary value problem, produces either the steady-state or transient time plane solutions. A sizeable part of the codes available provide rapid evaluation of the results. Besides contouring the new water potentials, the model allows graphical review of streamlines of flow, travel times, and detailed comparisons of surfaces or points at designated wells. Use of the graphics scopes provide immediate, but temporary displays which can be used for evaluation of input and output and which can be reproduced easily on hard copy devices, such as a line printer, Calcomp plotter and image photographs. (ERA citation 05:016633)

RRC-30 PC **A02**/MF **A01**
Reactor Research Centre, Kalpakkam (India).
Comparative Study of the Various Electrometric End Point Detections in Oxidimetric Estimations of Uranium.
A. Palamalai, T. S. Thankachan, and G. R. Balasubramanian. Nov 78, 14p
U.S. Sales Only.

In view of the highly intense beta-gamma activity levels of solutions from different streams from reprocessing plants of Fast Reactor Fuels, a programme for remote adaptations of analytical techniques for estimations of uranium, plutonium, thorium and free acidity has been initiated at the Reactor Research Centre, Kalpakkam. As first part of this programme, various electrometric end point detections for oxidimetric determination of uranium are compared for their precisions with a well evalu-

ated standard potentiometric technique. Those methods which are most suitable for remote manipulations are chosen for the development programme. Analytical procedures thus developed require only very little volume of reagents and generate low volumes of "active wastes". The modifications involve increasing the acidity of the diluting reagent to 4 and 8 N sulphuric acid, adding 10% vanadyl sulphate and allowing a standing time of 7 minutes after dilution. Improved precisions and easier identification of end points are observed as a result of these modifications. Also the increased acidity of the diluent prevents gelation and polymerisation of plutonium when present. Zero current potentiometry employing platinum indicator-tungsten reference electrodes is introduced for the first time in uranium estimation. This method, as well as two methods, voltametry and biamperometry using gold electrodes are found to show improved precisions than the said standard method. (Atomindex citation 10:478853)

SAND-79-1305 PC **A11**/MF **A01**
Sandia Labs., Albuquerque, NM.
Summary of Research and Development Activities in Support of Waste Acceptance Criteria for WIPP.
T. O. Hunter. Nov 79, 244p
Contract EY-76-C-04-0789

The development of waste acceptance criteria for the Waste Isolation Pilot Plant (WIPP) is summarized. Specifications for acceptable waste forms are included. Nine program areas are discussed. They are: TRU characterization, HLW interactions, thermal/structural interactions, nuclide migration, permeability, brine migration, borehole plugging, operation/design support, and instrumentation development. Recommendations are included. (ERA citation 05:011355)

SAND-80-0007/1 PC **A04**/MF **A01**
Sandia Labs., Albuquerque, NM.
Subseabed Disposal Program Plan. Volume I. Overview.
Jan 80, 67p
Contract EY-76-C-04-0789

Some of the most stable geologic formations are underneath the deep oceans. Purpose of this program is to assess the technical, environmental, and engineering feasibility of disposing of packaged high-level waste and/or repackaged spent reactor fuel in these formations. (ERA citation 05:014984)

UCRL-15176 PC **A06**/MF **A01**
Golder Associates, Inc., Golden, CO.
Numerical Modeling Capabilities to Predict Repository Performance.
Sep 79, 118p
Contract W-7405-ENG-48

This report presents a summary of current numerical modeling capabilities that are applicable to the design and performance evaluation of underground repositories for the storage of nuclear waste. The report includes codes that are available in-house, within Golder Associates and Lawrence Livermore Laboratories; as well as those that are generally available within the industry and universities. The first listing of programs are in-house codes in the subject areas of hydrology, solute transport, thermal and mechanical stress analysis, and structural geology. The second listing of programs are divided by subject into the following categories: site selection, structural geology, mine structural design, mine ventilation, hydrology, and mine design/construction/operation. These programs are not specifically designed for use in the design and evaluation of an underground repository for nuclear waste; but several or most of them may be so used. (ERA citation 05:014986)

18H. Radioactivity

AD-A083 755/9 MF **A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Engineering
A Computer Fallout Model for Operational Type Studies.
Master's thesis,
Richard F. Colarco. Mar 80, 223p Rept no. AFIT/GST/PH/80m-1
Availability: Microfiche copies only.

This study describes a method of calculating g(t), the rate of deposition on the ground of radioactivity from the stabilized cloud resulting from a nuclear ground burst. Particle fall dynamics are described by the method of Davies as formalized into a computational algorithm by McDonald. The radius of particle arriving on the ground at any time from a given altitude, and the rate of change of this radius with time are described by polynomials in 1/t. A table of coefficients of these polynomials from 200 meters t 50 km above sea level is provided. It was found that a pancake (zero-thickness) cloud is an excellent approximation to a vertically-distributed cloud with finite extent. This, and the closed form of the calculation, make for a relatively simple and straightforward algorithm, one in fact that approaches the ease of a hand calculation. (Author)

LA-8234-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Radioactivity in Soils and Sediments in and Adjacent to the Los Alamos Area, 1974-1977.
W. D. Purtymun, R. J. Peters, and A. K. Stoker.
Feb 80, 18p
Contract W-7405-ENG-36

Soils and sediments are analyzed for gross alpha, gross beta, exp 238 Pu, exp 239 Pu, exp 137 Cs, exp 90 Sr, and total uranium as part of the continuing Environmental Monitoring Program at the Los Alamos Scientific Laboratory. This report documents the levels of radioactivity of radionuclides in soils and sediments in northern New Mexico from natural sources and worldwide fallout as well as at seven on-site soil and sediment stations which contain radioactivity contributed by the Laboratory for the period 1974 through 1977. (ERA citation 05:016567)

NUREG/CR-1021 PC **A09**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Models Selected for Calculation of Doses, Health Effects and Economic Costs Due to Accidental Radionuclide Releases from Nuclear Power Plants.
Technical rept.,
D. L. Strenge, S. Acharya, D. A. Baker, J. G. Droppo, and R. B. McPherson. May 80, 188p
PNL-3108

Models are described for use in site-specific environmental consequence analysis of nuclear reactor accidents of Classes 3 through 9. The models presented relate radioactivity released to resulting doses, health effects, and costs of remedial actions. Specific models are presented for the major exposure pathways of airborne releases, waterborne releases and direct irradiation from activity within the facility buildings, such as the containment. Time-dependent atmospheric dispersion parameters, crop production parameters, and other variable parameters are used in the models. The environmental effects are analyzed for several accident start times during the year. Several remedial actions are considered.

ORNL/MIT-299 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Assessment of Two-Filter Technique for Correlating Actinium-227 Concentrations in Soils.
W. K. Fraizer, K. D. Patch, and B. A. Reynolds.
Feb 80, 45p
Contract W-7405-ENG-26

Concentrations of actinium-227 in soil samples from waste-disposal sites for uranium procession plants were successfully correlated with radon-219 measurements obtained by the two-filter technique, thus avoiding time-consuming and difficult radiochemical analyses. A flow-through sampling device and procedure were developed which determined actinium levels with a precision of 2 pCi/g +- 50%. Theoretical relations for the production of radon from actinium, the decay of radon, and the decay and diffusion of radon daughters in the two-filter apparatus were formulated. Measurements indicated that the emanation fraction for radon-219 was about 15%. Sampling filters collected radon daughters with a 93% efficiency while radon could be scrubbed from air samples by use of an activated-charcoal canister. (ERA citation 05:016586)

PB80-178148 Not available NTIS
National Bureau of Standards, Washington, DC.
Model for Diffusion of a Narrow Beam of Charged Particles.
Final rept.,
C. Eisenhauer. 1980, 19p
Pub. in Radiat. Res., v81 p336-354 1980.

A simple analytic expression is presented to describe the three-dimensional spatial distribution of flux or energy deposition by a narrow beam of charged particles. In this expression distances are expressed in terms of a scaling parameter that is proportional to the mean square scattering angle in a single collision. Finite ranges are expressed in terms of the continuous-slowing-down-range. Track-length distributions for one-velocity particles and energy deposition for electrons are discussed. Comparisons with rigorous Monte Carlo calculations show that departures from the analytic expression can be expressed as a slowly varying function of order unity. This function can be used as a basis for interpolation over a wide range of source energies and materials.

STUDSVIK-SM-78/44 PC **A03**/MF **A01**
Aktiebolaget Atomenergi, Studsvik (Sweden).
Atmospheric Diffusion and Effective Doses around the Forsmark-1 Reactor in Sweden in Normal Operation as Well as at a Reactor Accident.
O. Karlberg, O. Edlund, and C. Gyllander. Jun 78, 28p
In Swedish.
U.S. Sales Only.

The aim of the project was to estimate the doses to which the persons living around the Forsmark-1 reactor, Sweden, are exposed, when the reactor is in normal operation. Furthermore the consequences of a reactor accident have been estimated for various distributions of the released nuclides, various heights of the release and various release processes. The concentration statistics are based on meteorological data from Studsvik. (Atomindex citation 10:480085)

18I. Reactor Engineering and Operation

AECL-5962 PC **A03**/MF **A01**
Atomic Energy of Canada Ltd., Pinawa, (Manitoba). Whiteshell Nuclear Research Establishment.
Review of the Potential for Actinide Redistribution in CANDU Thorium Cycle Fuels.
D. J. Cameron. Feb 78, 31p
U.S. Sales Only.

Actinide redistribution resulting from large radial temperature gradients is an accepted feature of the technology of fast reactor (U,Pu)O sub 2 fuels. A thorium cycle in CANDU reactors would require the use of oxide fuels with two or more components, raising the question of actinide redistribution in these fuels. The mechanisms proposed to explain redistribution in (U,Pu)O sub 2 fuels are reviewed, and their relevance to fuels based on ThO sub 2 is discussed. The fuel primarily considered is (Th,U)O sub 2 but some reference is made to (Th,Pu)O sub 2 . At this early stage of thorium fuel cycle technology, it is not possible to consider quantitatively the question of redistribution in specific fuels. However, some guidelines can be presented to indicate to fuel engineers conditions which might result in significant redistribution. (Atomindex citation 09:411885)

AECL-6081 PC **A03**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Fuel Performance in NPD While Operating with Two-Phase Coolant.
A. S. Bain. Mar 78, 46p
U.S. Sales Only.

The NPD reactor operated as a boiling heavy water reactor from October 27, 1968 to April 16, 1971. At 25 MWe the steam quality at the steam generator inlet was 13 wt%, and fuel channel outlet steam qualities ranged from 2 to 22 wt%. During this period ammonia was used for oxygen suppression and pH control. At equilibrium the coolant had 7 mg NH sub 3 /kg D sub 2 O, 60 ml D sub 2 /kg D sub 2 O and 20 ml N sub 2 /kg D sub 2

O. The performance of the fuel was excellent during the time that NPD operated in the boiling mode. No indications were observed of dimensional changes, inter-element fretting, fuel/sheath interaction, excessive oxidation, excessive deuterium concentrations, or unusual migration of hydrogen and deuterium to the cooler end plugs. One element defected; although the defect mechanism could not be identified at the time, we now believe the defect was associated with faulty bar stock for end plugs. The behaviour of the defective element was similar to that for other defective elements in CANDU reactors. No problems were encountered in removing the defected bundle from the reactor. (Atomindex citation 10:427100)

AECL-6183 PC **A03**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Valve Stem Packing Seal Test Results for Primary Heat Transport System Conditions in Canadian Nuclear Generating Stations.
D. F. Dixon, J. M. Farrell, and R. F. Coutinho. Jun 78, 46p
U.S. Sales Only.

Valve stem packing tests were done to obtain performance data on packing already in CANDU-PHW reactor service and on alternative packings. Most of the tests were replicated. Results are presented for ten packings tested under two stem cycle modes; leakage, packing consolidation and packing friction were the main responses. Packing tests were performed with water at close to CANDU-PHW reactor primary heat transport (PHT) system conditions (288 deg C and 10 MPa), but without ionizing radiation. The test rigs had rising, rotating stems. Stuffing box dimensions were typical of a standard Velan valve; packings were spring loaded to control applied packing stress. (Atomindex citation 10:427103)

AECL-6200 PC **A06**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Final Argument Relating to the Canadian Nuclear Power Program. A Brief to the Ontario Royal Commission on Electric Power Planning.
J. A. L. Robertson. May 78, 105p
U.S. Sales Only.

This report is the second brief, and one of a number of documents, submitted by Atomic Energy of Canada Limited (AECL) to the Ontario Royal Commission on Electric Power Planning. It is intended to update the original brief (AECL--5800) with respect to those matters that emerged during the course of the hearings and which had not been fully anticipated in that brief, as well as to summarize the AECL position on the various issues. To enable it to qualify as a "final argument" it contains only evidence or material that has been presented to the Royal Commission and is provided with marginal notations identifying the source of each section. It is AECL's position that the Canadian nuclear power program provides a safe, proven and efficient means of making a needed contribution to electricity supply, while strengthening the economy through the deployment of indigenous technology and resources. (Atomindex citation 09:411332)

AECL-6414 PC **A02**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Some Thorium Fuel Cycle Strategies.
M. F. Duret, and H. Hatton. Feb 79, 18p
U.S. Sales Only.

The report deals with the problem of introducing an advanced nuclear fuel cycle based on thorium in Canada. It is pointed out that timing and introduction rate are important considerations, certain choices of these variables may lead to undesirable business fluctuations in some of the industries involved in the production of nuclear energy. (Atomindex citation 10:492289)

AED-Conf-77-329-002 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation (ZAED), Eggenstein-Leopoldshafen (Germany, F.R.).
Energies of the Future. The Role of Nuclear Power.
H. Matthoefer. 1977, 24p CONF-7710166-7
In German.Problems of nuclear energy supply - chances, risks and perspectives in a changing energy economy, Bonn-Bad Godesberg, F.R. Germany, 3 Oct 1977.
U.S. Sales Only.

This paper outlines the general principles of the energy policy of the Federal Government. The main points of emphasis are stressed, and the limits of energy supply for the ever-growing demand without new options are pointed out. For the future, a reasonable extension of nuclear power is required. Solar energy and energy conservation are no alternatives. The tendency of this papar points to the 2nd amendment of the energy programme of the Federal Government that will soon be published. (UA) 891 UA. (Atomindex citation 10:431068)

AED-Conf-77-498-006 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Requirements of on-Site Facilities.
H. Burchardt. 1977, 25p CONF-7709147-19
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

The following topics are covered: 1) Requirements of on-site facilities: a) brief description of supplying the site with electricity and water; communication facilities, b) necessary facilities for containment and pipeline installation, c) necessary facilities for storage, safety, accommodation of personnel, housing; workshops; 2) site management: a) organisation schedules for 'turn-key-jobs' and 'single commission', b) duties of the supervisory staff. (Atomindex citation 09:383455)

AED-Conf-77-498-009 MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Experience in Developing Countries in Monitoring Procurement and Fabrication.
B. J. Csik. 1977, 9p CONF-7709147-11
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only. Microfiche copies only.

The following topics are discussed: owne:'r responsibility in monitoring procurement and fabrication. Monitoring ectivity, tasks, knowledge and personnel requirements, scope and organization. Contractual arrangements, commitments, responsibilities, rights and obligations. Domestic and foreign supplies. Staff and consultants. Experience in developing countries. Problem areas: availability of qualified staff, organization, methodology standards, codes, specifications, availability and flow of information, language, technical knowledge, access to suppliers' facilities, delays, nuclear safety related components, modifications and additionals. (Atomindex citation 09:383064)

AED-Conf-77-498-012 MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Decontamination of Surfaces.
Z. Dlouhy. 1977, 17p CONF-7709147-10
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only. Microfiche copies only.

Main sources and characteristics of wastes are discussed and basic data are given on the amount and nature of all wastes produced during the treatment of liquid and gaseous wastes in nuclear power plants with boiling (BWR), pressurized (PWR), and advanced gas-cooled (MGR) reactors of a 1,000 MW(e) installed power. A short comparison of methods used for liquid radioactive waste treatment is given. Methods are shortly described for solidification of concentrates, sludges, resin slurries, and for immobilization of radioactive substances in other solid wastes. An approach to the problem of waste storage in a densely populated country is given. The part dealing with surface decontamination problems is dedicated to contaminant sources in gas and water-cooled reactors, to decontaminating agents used in reactor technology, and to the description of most important methods used in decontamination practice. A short evaluation of protective coatings from the point of view of their further successful decontamination is given. (Atomindex citation 09:383059)

AED-Conf-77-498-017 PC **A03**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Requirements of Safety and Reliability.
L. F. Franzen. 1977, 30p CONF-7709147-3
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

The safety strategy for nuclear power plants is characterized by the fact that the high level of safety was attained not as a result of experience, but on the basis of preventive accident analyses and the findings derived from such analyses. Although, in these accident analyses, the deterministic approach is predominant it is supplemented by reliability analyses. The accidents analyzed in nuclear licensing procedures cover a wide spectrum from minor incidents to the design basis accidents which determine the design of the safety devices. The initial and boundary conditions, which are essential for accident analyses, and the determination of the loads occuring in various states during regular operation and in accidents flow into the design of the individual systems and components. The inevitable residual risk and its origins are discussed. (Atomindex citation 09:382894)

AED-Conf-77-498-018 PC **A03**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Nuclear Power Plant's Safety and Risk (Requirements of Safety and Reliability).
L. F. Franzen. 1977, 50p CONF-7709147-4
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

Starting out from the given safety objectives as they have evolved during the past few years and from the present legal and regulatory provisions for the construction and operation of nuclear power plants, the hazards involved in regular operation, accidents and emergency situations are discussed. In compliance with the positive safety balance of nuclear power plants in the FRG, special attention is focused on the preventive safety analysis within the frame of the nuclear licensing procedure. Reference is made to the beginnings of a comprehensive hazard concept for an unbiased plant assessment. Emergency situations are discussed from the point of view of general hazard comparisons. (Atomindex citation 09:382895)

AED-Conf-77-498-021 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Selection of Operations Staff, Qualifications and Experience.
H. Gutmann. 1977, 18p CONF-7709147-22
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

Requirements and suggestions have been made by authorities and various organisations in a number of countries which define necessary experience and training for the various groups of nuclear power plant personnel. For two countries, the USA and the FRG, a comparison has been made which shows that there is only a slight deviation, taking into account the different education systems. With the example of the Biblis nuclear power plant the training on the job is described. Especially the production or operation department is looked at in more detail. The training is split up into several parts: a general part, such as nuclear physics, reactor physics and engineering, reactor safety, radiation protection and so on and a plant related part, such as arrangement and mode of operation of the plant under normal and accident conditions, license conditions and so on. (Atomindex citation 09:383468)

AED-Conf-77-498-023 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).

Development of Preventive Maintenance Procedures and Schedules.
H. V. Schlenker, and J. Hammel. 1977, 17p CONF-7709147-34
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

An outline of the procedures and schedules developed for preventive maintenance in power stations within the Rheinisch-Westfaelisches Elektrizitaetswerk (RWE) is presented. After an introduction of maintenance in general the different kinds of preventive maintenance activities are described. This includes also the prerequisite identification systems. The aims of preventive maintenance and the measures are explained that have to be taken, if these aims are to be achieved. A number of examples from actual practice are cited. (Atomindex citation 09:383494)

AED-Conf-77-498-033 MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Operation Manuals, Standard Operating Procedures and Routine Testing.
W. Klein. 1977, 28p CONF-7709147-9
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only. Microfiche copies only.

The function of the operating manual for nuclear power plant operators, the concept and structure of the operating manual, and a summary and an outlook are described. (Atomindex citation 09:383054)

AED-Conf-77-498-035 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Clean Conditions During the Erection Phase.
P. Koschel. 1977, 18p CONF-7709147-24
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

Following the basic requirements of the Regulatory Guide 1.37 and ANSI 45.2.1 - Standard on Cleaning of Fluid Systems and Associated Components during the Construction Phase of Nuclear Power Plants as a guideline, the implementation of cleaning operations in the pre-installation phase, the installation phase and the maintenance of clean conditions until the operational phase is covered. Specific information will be given from the practical experience point of view with the work execution under clean conditions of piping and components at the semi-finished product manufacturer, the prefabrication workshop and the on-site installation with specific reference to the various detailed procedures required by individual system builders for nuclear power plants in Germany and abroad. (Atomindex citation 09:383474)

AED-Conf-77-498-048 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Transference of Know-How for the Fabrication of Heavy Components for Nuclear Power Reactors.
F. Meier. 1977, 11p CONF-7709147-14
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

The following topica are covered: 1) Heavy components for nuclear power reactors. Reactor pressure vessels with total weight of 540 tons; steam generators: heat exchangers with U-type tube bundles, total weight 420 tons. 2) Choice of know-how recipient. Technical criteria, i.e. manufacturing facilities, existing quality assurance system, location of the workshops, possibilities for training, infrastructures. 3. Measures for transferring know-how to a newly established company. Planning and erection of the factory: organisational set up of the company; personnel selection and training; transfer of documentation; transfer of know-how that cannot be transferred in a written form. 4) Contracts for assuring the transfer of know-how. Stipulation of mutual rights and obligations of the know-how owner and receiver in individual contracts: engineering services contract, technical information contract, personnel training contract, license contract. (Atomindex citation 09:383399)

AED-Conf-77-498-051 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Owner's Role During Design and Construction Phases of the Plant.
A. E. F. Mueller. 1977, 15p CONF-7709147-27
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

Role of Participants; Owner's Role: during Design Phase; Construction Phase; Commissioning Phase; Owner's Organization. (Atomindex citation 09:383483)

AED-Conf-77-498-053 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Essential Supplies of Electricity Water and Consumables During Construction, General Services.
A. E. F. Mueller. 1977, 8p CONF-7709147-5
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

The paper deals with the main supply services, the consumables, the use of water, compressed air, and general sevices during the construction of a nuclear power plant in Brazil. (Atomindex citation 09:382972)

AED-Conf-77-498-054 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Requirements of Quality Standards.
J. Mueller. 1977, 16p CONF-7709147-28
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

The lecture traces the development of nuclear standards, codes, and Federal regulations on quality assurance (QA) for nuclear power plants and associated facilities. The technical evolution of the last twelve years, especially in the area of nuclear technology, led to different activities and regulatory initiatives, and the present result is: several nations have their own homemade standards. The lecture discusses the former and especially current activities in standard development, and gives a description of the requirements of QA-standards used in USA and Europe, especially Western Germany. Furthermore the lecture attempts to give a comparison and an evaluation of the international quality standards from the author's viewpoint. Finally the lecture presents an outlook for the future international implications of QA-standards. There is an urgent need within the nuclear industry for simplification and standardization of QA-standards. The relationship between the various standards, and the applicability of the standards need clarification and a better transparancy. To point out these problems is the purpose of the lecture. (Atomindex citation 09:383484)

AED-Conf-77-498-056 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Component Codification and Identification Systems.
K. Pannenbaecker. 1977, 25p CONF-7709147-15
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

The lecture covers the codification in power stations during the erection phase and commercial operation phase. A diagram gives a survey. There are three basic-codifications for application; 1) Kraftwerk-Kennzeichen-System (KKS) for marking each component in orientated systems, for marking electrical orientated positions in cubicals, switch gears etc. and for marking rooms in buildings; 2) Ordnungssystem (OS) for cost calculation and ordering; 3) Unterlagenarten-Schluessel (UAS) for letters, reports etc. and for documentation. The OS is developed on the principle of cost account number and is therefore close to the organization of each supplier and his special form of design and construtlon. KKS has only to mark hardware. Therefore all German owners, consultants, authorities and suppliers develop KKS together and conform to it in DIN 407119. (Atomindex citation 09:383404)

AED-Conf-77-498-062 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Role of Participants in Nuclear Power Projects.
A. J. Polliart. 1977, 10p CONF-7709147-12
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

In this article staffing requirements for nuclear projects (Turnkey Contract) and the owner's staff requirements, project planning, project implementation, and plant construction and commissioning are treated. (Atomindex citation 09:383325)

AED-Conf-77-498-071 PC **A03**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Routine Testing on Protective and Safety Systems and Components.
W. Rysy. 1977, 48p CONF-7709147-33
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

The following topics are discussed: 1) In-process inspection, tests during commissioning. 2) Tests during reactor operation. 2.1) Reactor protection system, for example: continuous auto-testing by a dynamic system, check of the output signals; 2.2) safety features: selected examples: functional tests on the ECCS, trial operation of the emergency diesels. 3) Tests during refuelling phase. 3.1) Containment: Leakage rate tests, leak testing; 3.2) coolant system: selected examples: inservice inspections of the pressure vessel, eddy current testing of the steam generator, functional tests of safety valves. (Atomindex citation 09:383493)

AED-Conf-77-498-079 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Basic Principles of Quality Assurance.
M. Stauffer. 1977, 22p CONF-7709147-16
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

After a brief review of the origin of the 'quality concept' and the historical development of quality assurance, questions such as 'what is QA' and 'why is QA so important in nuclear technology' as well as definitions and main requirements of relevant QA codes and standards are presented and discussed. By means of a project realization schematic, tasks, duties, responsibilities, and possible QA organigrammes as well as QA programme and manual requirements are explained and compared. From a QA point of view, it is shown that no basic difference exists between design and production or construction control activities. Special emphasis is layed upon active owner's participation in the implementation of QA programmes for NPP and the advantages offered are described and illustrated by typical examples. (Atomindex citation 09:383412)

AED-Conf-77-498-082 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Technical Description of Other Types of Reactors.
H. Vollmer. 1977, 21p CONF-7709147-49
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

The paper reviews the development of reactor systems other than LWR, i. e. gas cooled reactors.

heavy water reactors and fast breeders. The specific features of these reactors are discussed. Technical details on plant design of the various systems will be given as well as the present status-of-the-art. (Atomindex citation 09:383645)

AED-Conf-77-498-084 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Accommodating for Plant Modifications.
P. H. Weirich. 1977, 7p CONF-7709147-37
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

Modification to a nuclear power plant may have different causes: 1) new instructions by the authorities; 2) changes of the marginal conditions on the construction site; 3) progress in the technological development. - Examples from different plants are supposed to demonstrate how such changes influence the planning or the construction and how they are integrated in the process of preparation. A distinction can be made between modifications before the completion of the submission of the order, during the phase of preparatory planning and during the construction phase. Of great importance are especially modifications made after the beginning of the construction works, since, in general, there is little scope for technical modifications and since consequences for the time schedule are to be expected. (Atomindex citation 09:383507)

AED-Conf-77-498-087 PC **A03**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Fuel Cycles of D sub 2 O-, Fast Breeder and High Temperature Reactors.
H. J. Zech. 1977, 28p CONF-7709147-50
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

Heavy water reactors (e.g. CANDU, MZFR) show marked differences in fuelling compared to the common LWR-types. So do HTGR and FBR. This lecture summarizes the main features of these differences, and discusses their consequences. The emphasis is on heavy water reactors for power production. This survey is intended to convey general background information on fuelling, to recollect material of previous courses, and to indicate new developments in this field. (Atomindex citation 09:383663)

AED-Conf-77-498-090 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Industrial Safety and Fire Protection During the Construction Phase.
K. Zimmer. 1977, 15p CONF-7709147-8
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only.

The questions and problems of industrial safety and fire prevention have to be treated like the activities planning, developing, assembly, etc. This statement is illustrated by statistics of the fire insurance companies, from which it can be seen that the number of fire accidents has decreased but that the damage caused has greatly increased. The sooner the fire prevention and industrial safety measures are integrated in the planning phase, the better for the total costs. Preventive measures that possibly have to be introduced at a later stage are not only generally much more expensive but are also seldom as effective. (Atomindex citation 09:383052)

AED-Conf-78-004-002 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Underground Construction of Nuclear Power Plants.
W. Kroeger. 1978, 15p CONF-780149-7
In German.Meeting on the safety of the light-water reactor, Mainz, F.R. Germany, 16 Jan 1978.
U.S. Sales Only.

The study arrived at the following results: 1) In most cases, studies of the underground construction of nuclear power plants are provisional measures adopted by governments. The motivations and conclusions depend on the conditions prevailing in a country. 2) Imbedding a plant in the ground (cut-and-cover burial technique) is a procedure which is already technically feasible. The construction of rock caverns of > 45 m (> 60 m) appears to be possible, but has not yet been clarified sufficiently well, especially in Germany. 3) Proper plant design can avoid undue impacts upon plant processes and accessibility to the plant. 4) Rock cavern structures 'automatically' offer a high protection potential from external and internal impacts. A similar potential can be secured by design measures for cut-and-cover systems. Seals and penetrations remain hazard areas. 5) Underground construction causes extra cost (approx. 20% of the building cost) and prolongs the construction time (1.5 to 2.0 yrs.). 6) In Germany there are siting restrictions for rock cavern structures. - If this consideration is limited to the safety standard now reached and to the usual licensing practice, there is no compelling reason for moving away from the usual above-ground way of constructing buildings and incurring additional costs, technical problems and uncertainties. (Atomindex citation 09:383476)

AED-Conf-78-011-000 PC **A02**/MF **A01**
Neutron-Physical Layout of BWR Fuel Elements Containing Pu: Method of Calculation and Experimental Verification.
G. Ambrosius, and H. Stein. 1978, 1p CONF-780163-, AED-Conf-78-011-002
In German.KTG technical meeting on the recycling of fissile materials obtained in the various reactor types from the point of view of reactor design, Juelich, F.R. Germany, 24 Jan 1978.
U.S. Sales Only.

No abstract available.

AED-Conf-78-155-053 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation (ZAED), Eggenstein-Leopoldshafen (Germany, F.R.).
Uses for Process Steam from Large Power Plants.
D. Brinkmann, C. Koch, K. Kuenstle, R. Mueller, and K. Reiter. 1978, 11p CONF-7804102-36
In German.Systems exhibition energy within the context of the Hannover fair, Hannover, F.R. Germany, 19 Apr 1978.
U.S. Sales Only.

The possibilities of coupling in process steam and electric power from LWR reactors in chemical plants are investigated with the aid of examples from two different fileds: 1) winning of the energy sources gas and liquid hydrocarbons from energy raw materials (coal, oil shales, oil sands, heavy oil sources), and 2) winning of raw materials. (orig.) 891 GG. (Atomindex citation 10:430738)

AEEW-R-1158 PC **A02**/MF **A01**
UKAEA, Winfrith (England). Atomic Energy Establishment.
SCRIM - WRS System Module Number 22947 for Small Core Removal Calculations.
J. Emmett, and M. J. Grimstone. Jun 78, 24p
U.S. Sales Only.

The WRS Modular Programming System has been developed as a means by which programmes may be more efficiently constructed, maintained and modified. In this system a module is a self-contained unit typically composed of one or more Fortran routines, and a programme is constructed from a number of such modules. This report describes one WRS module, the function of which is to calculate the uncollided flux and first collision sources in a slab shield due to neutrons from a small cylindrical reactor core. (Atomindex citation 10:426855)

AEEW-R-1186 PC **A03**/MF **A01**
UKAEA, Winfrith. Atomic Energy Establishment.
FACADE Version of JOSHUA.
M. J. Roth, and M. A. Thompson. Jul 78, 28p
U.S. Sales Only.

JOSHUA is a computer program, which simulates the neutronics, hydraulics, burn-up and refuelling of water cooled reactors. Its neutronics data in the form of macroscopic cross-sections are normally prepared by a lattice cell program such as WIMS. The method of transfer of data from WIMS to JOSHUA has been simplified by the use of the FACADE system. This report describes the input to the version of JOSHUA that uses FACADE. (Atomindex citation 10:437907)

AEEW-R-1196 PC **A04**/MF **A01**
UKAEA, Winfrith. Atomic Energy Establishment.
RELAP-UK MK 4 Transient Thermal-Hydraulic Code Summary and Input Data Description.
I. Brittain, W. Bryce, and C. Green. Aug 78, 65p
U.S. Sales Only.

RELAP-UK MK IV is the latest UK code in the RELAP series of transient thermal-hydraulic codes for water reactor safety and fault analysis. It is the first version with full capability for PWR blowdown. The major improvements over earlier versions are a drift flux model, the Bryce flow-dependent slip correlation, a revised bubble rise model and a generalised 'heat slab' option. Other developments include a simple rewetting model, Fanning friction factor and change of area pressure drop models, time-dependent boundary nodes and an option to input pump speed history. RELAP-UK MK IV is available on the Harwell IBM 370-168 computer. (Atomindex citation 10:437686)

AEEW-R-1235 PC **A03**/MF **A01**
UKAEA Atomic Energy Establishment, Winfrith (England).
Fission Product Migration Deposition of Cesium on Oxidised Metals.
P. R. Rowland. Feb 79, 32p
U.S. Sales Only.

A programme of fission product plate-out and lift-off work relevant to gas cooled reactor safety is presented. Progress so far on the plate-out of cesium on metal specimens exposed for a fixed time in an HTR coolant is reported. It was found that the cesium activity of a specimen was related to the weight gain due to oxidation by (Activity) x (Wt Gain) exp 2 . This is interpreted by a common factor model in which both the rate of growth of the oxide and the solubility of cesium in it are controlled by the oxidising agents (from the coolant) dissolved in it. This offers the possibility of relating plate-out and corrosion studies with a single set of data. Autoradiography of oxide films grown in crevices between specimens showed cases of plate-out in stripes which correspond to stripes in oxide thickness. This has been interpreted as a Liesegang phenomenon. It is not of importance to safety studies but may be of use for investigating mechanisms of corrosion. (Atomindex citation 10:481755)

AERE-R-9210 PC **A06**/MF **A01**
UKAEA, Harwell (England). Atomic Energy Research Establishment.
2DT, 3DT and 2DS - Two- and Three-Dimensional Transient and Two-Dimensional Steady State Heat-Transfer Finite-Difference Computer Programs.
T. D. A. Kennedy. Aug 78, 115p
U.S. Sales Only.

Technical assessment of accident conditions in nuclear reactors, and many problems in other fields, require the solution of the transient temperature distribution in solid regions in contact with flowing fluids. In this situation the fluid temperatures are dependent on heat transfer between the fluids and the solids, and so these temperatures cannot be supplied as preset boundary conditions. The transient programs deal with this problem by a method used in the three-dimensional program RAT-3D. This method uses a two-step iteration procedure in which solution of the set of time-dependent heat-conduction finite-difference equations alternates with solution of the heat-balance equations for Newtonian cooling so that a new set of boundary conditions are obtained for the next solution of the heat-conduction equations. The set of heat-conduction equations are solved by the alternating-direction method. The two-dimensional steady-state program, 2DS, cannot accept internal coolants, and must be supplied with temperatures and heat-transfer coefficients for all external boundaries. It is simpler to use than the transient program in that no time history is required, and its use is therefore preferred for the solution of steady-state problems which do not contain inter-

nal coolants. Radiation between solid regions and to the outside environment is allowed for in all the programs. Thermal expansion is taken into account for heat transfer across radial gaps between solid materials. The programs are written to keep input data simple and computing costs low. (Atomindex citation 10:433399)

BF-R-62-944-1 PC **A05**/MF **A01**
Battelle-Institut e.V., Frankfurt am Main (Germany, F.R.).
Preliminary Experiments on Leakage Monitoring Using Acoustic Emission Analysis. Final Report.
P. Jax. Mar 77, 100p
In German.
U.S. Sales Only.

Various leakages were set up under the temperature and pressure conditions of a Pressurised Water Reactor in a test circuit at KWU, Erlangen, and the acoustic emission signals generated by the water flowing in the range of 50 to 800kHz were analysed. It was the purpose of the investigations to determine whether it is basically possible, using analysis of acoustic emission (SEA), to show leakages in the presence of similar operational background noise. Further, possible parameters having an effect on acoustic emission were to be examined by random sampling. Important differences in the spreading characteristics of leakage noises compared with the burst signals emitted during faults were found in preliminary experiments. The spread attenuation is appreciably more dependent on the structure of the subject of the test than for burst signals, according to these results, and decreases noticeably with rising frequency in the range 50 to 800 kHz. In the presence of the background noise existing in the test circuit, good sensitivity of the SEA could be demonstrated. All leakages examined (crack-, flange- and stuffing box - leakage) with leak rates of 25kg/hour were clearly shown over the full test section. This also applied for an unexpected leakage in the test circuit. (leakage rate about 10 to 20 kg/hour). The limit for total leakage monitoring (100 % monitoring with sensors at intervals) should therefore be well below 25 kg/hour. The results with various leakages show that the amplitude and frequency spectrum of acoustic emission depend on the parameters investigated, i.e. type of leak, leak rate and the temperature of the water. (Atomindex citation 10:441816)

BMFT-FB-K-78-10 PC **A03**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Process Computer Program for the Calculation of Two Dimensional Power Distributions in Pressurized Light Water Reactors.
J. Fite. May 78, 33p
In German.
U.S. Sales Only.

PROMED is a two-dimensional, two energy group burnup program which computes flux and power distribution performing a boron poison search or a calculation of ksub(eff) and the burnup distribution. At the beginning of a time step the program can, by option, insert a pre-determined rod configuration and perform a criticality search. This rod configuration can remain inserted during the time step or can be withdrawn. All these computations may be performed for a total, half, quarter or eighth reactor cross section. PROMED is written in FORTRAN IV for the Siemens '306' process computer system. (Atomindex citation 10:437988)

BMFT-FB-K-78-11 PC **A04**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesberg (Germany, F.R.).
Investigation of the Cycle Duration Flexibility of Pressurized Lightwater Reactors.
F. Bauer, and W. Kolimar. May 78, 61p
In German.
U.S. Sales Only.

Regarding the cycle duration flexibility of pressurized water reactors, the - Adaptation of computer codes and test cases - Fuel element shuffling schemes after stretch-out operation - First core fuel arrangement - Economic investigations were investigated. The achieved results should enable power station operators to have a certain freedom in the choice of the fuel reloading time and to optimise an economical operation of their plants.. (Atomindex citation 10:438009)

CEA-CONF-4191 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Services des Piles.
Experimental Reactor Osiris and the Nuclear Fuel Technology for the P.W.R. Reactors.
G. Lestiboudois, G. de Contenson, J. P. Genthon, M. Molvault, and M. Roche. 1977, 15p CONF-771189-6
In French.Symposium on the future of research reactors, Grenoble, France, Nov 1977.
U.S. Sales Only.

The possibility of employing research reactors to study and to improve the nuclear fuel of the power reactors is presented. Measurements of temperature, pressure, stresses, thermal balance, gamma spectrometry and neutron radiography, allow the study of fuel densification, the influence of the initial filling pressure on the fission gas release and the gadolinium efficiency evolution. The solutions of the problems of failed element detection, power increase, remote handling, are presented. (Atomindex citation 10:438016)

CEA-CONF-4238 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. des Etudes Mecaniques et Thermiques.
French Energy Resources and Needs. Incidence on the Development of the National Nuclear Programme.
Roger Martin. 17 Nov 77, 25p CONF-7711131-1
In French.Conference on the French energy resources and needs, Copenhagen, Denmark, 11 Nov 1977.
U.S. Sales Only.

The energy flux diagram for France in 1970 is presented. Presented also is the disparity observed between the utilization factors in the final stage: 75% for the domestic and tertiary sector, 75% for industry and siderurgy, 65% for agriculture, and 25% for transports. The total utilization factor is 47.5% (124.4 MTEC used for 137.6 MTEC unused; the unit used being the Million of Tons Equivalent to Coal. Two dates are arbitrarily envisaged (1985 and 2000) in the evolution of the French energy technology and structure. The energy flux diagram predicted for 1985 requires nuclear power be nearly a quarter of the resources, with an enhanced part from hydraulics (+30%) and should involve geothermy, heat wastes and solar energy. (Atomindex citation 10:463791)

CONF-800219-1 MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Overview of the PBF Test Results.
H. J. Zeile. 1980, 30p
Contract EY-76-C-07-1570
NSRR technical review meeting, Tokai-mura, Japan, 18 Feb 1980.
Microfiche copies only.

The Thermal Fuels Behavior Program (TFBP) of EG and G Idaho conducts fuel behavior research in the Power Burst Facility (PBF) at INEL and at the Halden Reactor in Norway. The fuels behavior research in the PBF is directed toward providing a detailed understanding of the response of light water reactor (LWR) nuclear fuel assemblies to off-normal and hypothesized accident conditions. Single fuel rods and clusters of highly instrumented fuel rods are installed within a central test space of the PBF core for testing. The core can be operated in various modes to provide test conditions typical of accidents and off-normal conditions that may be experienced in a pressurized water reactor or a boiling water reactor. (ERA citation 05:015803)

CONF-800403-1 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Loft Fire Protection.
E. R. White, and J. D. Jensen. 1980, 6p
Contract EY-76-C-07-1570
ANS thermal reactor safety meeting, Knoxville, TN, USA, 8 Apr 1980.

Quantified criteria that was developed and applied to provide in-depth fire protection for the Loss of Fluid Test (LOFT) Facility are presented. The presentation describes the evolution process that elevated the facility's fire protection from minimal to that required for a highly protected risk or improved risk. Explored are some infrequently used fire protection measures that are poorly understood outside the fire protection profession. (ERA citation 05:015790)

CONF-800403-2 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Response Trees for Emergency Operator Action at the LOFT Facility.
W. R. Nelson. 1980, 8p
Contract EY-76-C-07-1570
ANS thermal reactor safety meeting, Knoxville, TN, USA, 8 Apr 1980.

Following the onset of an accident which disables equipment used for normal reactor cooling, the first priority of the nuclear plant operator is to ensure that the reactor core is covered and that adequate cooling water flow is established. During this time, he must evaluate the situation, determine which emergency procedures apply, find the appropriate procedures, and perform the prescribed actions. Failure to respond quickly and effectively could result in expensive facility damages and potential hazards to the public. A procedure which attempts to streamline this short-term response process has been developed and implemented for the Loss of Fluid Test (LOFT) facility. (ERA citation 05:015804)

EUR-6119 PC **A06**/MF **A01**
Commission of the European Communities, Brussels (Belgium).
EEC-Sponsored Theoretical Studies of Gas Cloud Explosion Pressure Loadings. Final Report.
F. Briscoe, N. Curtress, C. L. Farmer, G. J. Fogg, and G. J. Vaughan. 1979, 120p
U.S. Sales Only.

Estimates of the pressure loadings produced by unconfined gas cloud explosions on the surface of structures are required to assist the design of strong secondary containments in countries where the protection of nuclear installations against these events is considered to be necessary. At the present time, one difficulty in the specification of accurate pressure loadings arises from lack of knowledge concerning the interaction between the incident pressure waves produced by unconfined gas cloud explosions and large structures. Preliminary theoretical studies include (i) general theoretical considerations, especially with regard to scaling (ii) investigations of the deflagration wave interaction with a wall based on an analytic solution for situations with planar symmetry and the application of an SRD gas cloud explosion code (GASEX 1) for situations with planar and spherical symmetry, and (iii) investigations of the interaction between shock waves and structures for situations with two-dimensional symmetry based on the application of another SRD gas cloud explosion code. (Atomindex citation 10:491125)

FEI-715 PC **A02**/MF **A01**
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.
Calculation of Temperature Fields in Inlet Regions of Fuel Element Clusters in a Liquid-Metal Coolant Turbulent Flow.
A. V. Zhukov, and G. P. Kirillova. 1976, 22p
In Russian.
U.S. Sales Only.

The numerical solution of the problem concerning heat exchange of the initial section of the fuel element lattices subjected to the turbulent flow of the liquid-metal coolant is given. The density of the volumetric heat liberation in the fuel elements has been considered be uniform and the velocity profile has been considered to be stable. Only the longitudinal heat flows have been regarded. The calculations are performed within a wide range of the basic parameters: fuel element relative spacing - 1.02 (<=) S/d (<=) 2.0; equivalent fuel element heat conduction - 0.01 (<=) epsilon (<=) 10; the Pekle number - 100 (<=) Pe (<=) 2500. The calculation results are presented in the form of a general formula for estimations of the temperature fields and heat transfer on the initial section of the fuel element lattices. The coefficients used in the

formula are shown in the form of nomograms. It has been established that the lengths of the initial thermal sections decrease with the increase of the spacing and equivalent heat conduction of the fuel elements and depend on the coolant flow conditions. For the laminar and rod flows, the length is directly proportional to the Pekle numbers, while for the turbulent flow, the length reaches its maximum in the Re function. The nomograms provide for determination of the length of the initial thermal sections within the considered ranges of variation of the parameters. (Atomindex citation 10:437705)

FEI-735 **MF A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Study of Hydraulic Characteristics of Reactor Fuel Rod Bundles by the Dimensionless Complex Method.
K. I. Savkov. 1977, 19p
In Russian.
U.S. Sales Only. Microfiche copies only.

An analytical method has been developed to study the total hydraulic resistance of fuel rod bundles in terms of dimensionless coolant pressure drops. The method is applied to cylindrical, conical and true prismatic bundles. The formulae of the hydroulic resistance are presented as power functions of the Reynolds number at laminar, transient and turbulent flow of the coolant in channels. The method, as contrary to all the others, can be used when only geometric parameters of the bundle and physical characteristics of the coolant circulating therein, are known. (Atomindex citation 10:433521)

FEI-778 **MF A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Calculation of Nonstationary Two-Dimensional Temperature Field in a Tube Wall in Burnout.
V. M. Kashcheev, T. V. Pykhtina, and Yu. S. Yur'ev. 1977, 16p
In Russian.
U.S. Sales Only. Microfiche copies only.

Numerically solved is a nonstationary two-dimensional equation of heat conduction for a tube wall of fuel element simulator with arbitrary energy release. The tube is heat-insulated from the outside. The vapour-liquid mixture flows inside the tube. The burnout is realized, when the heat transfer coefficient corresponds to the developed boiling in one part of the tube, and to the deteriorated regime in the other part of it. The thermal losses are regarded on both ends of the tube. Given are the statement of the problem, the algorithm of the solution, the results of the test adjusting problem. Obtained is the satisfactory agreement of calculated fixed temperature with experimental one. (Atomindex citation 10:433397)

GRS-F-66 **PC A99/MF A01**
Gesellschaft fuer Reaktorsicherheit m.b.H., Cologne (Germany, F.R.).
Reports on Research Projects in the Field of Reactor Safety Sponsored by the Federal Minister for Research and Technology. Period under Report: April 1 to June 30, 1978.
Sep 78, 673p
In German.
U.S. Sales Only.

Investigations on the safety of Light Water Reactors (LWR) being performed in the framework of the Research Program Reactor Safety (RS - Projects) are sponsored by the BMFT (Federal Minister for Research and Technology), der Bundesminister fuer Forschung und Technologie. Objective of this program is to investigate in greater detail the safety margins of nuclear power plants and their systems and the further development of safety technology. Besides the investigations of LWR tasks first projects on the safety of FBR type reactors are sponsored by the BMFT. The GRS (Reactor Safety Association), Gesellschaft fuer Reaktorsicherheit mbH, by order of the BMFT, informs continuously of the status of such investigations by means of quarterly and annually publication of progress reports within the series GRS - F Fortschrittsberichte (GRS - F - Progress Reports). Each progress report represents a compilation of individual reports about objectives, the work performed, the results, the next steps of the work etc. The individual reports are prepared in a standard form by the contractors themselves as a documentation of their progress in work. The individual reports are arranged according to the amended LWR Safety Research Program of the BMFT. Another table contents uses the same classification system as applied in the Nuclear Safety Index of the CEC Communities and the OECD. (orig./HP) 891 HP. (Atomindex citation 10:433148)

GRS-S-21 **MF A01**
Gesellschaft fuer Reaktorsicherheit m.b.H. (GRS), Garching (Germany, F.R.).
Comments on Topical Questions of Nuclear Energy. Selection of Statements by the Federal Government. 7th Legislative Period 1972/1976.
H. Butz, and M. Noll. May 78, 617p
In German.
U.S. Sales Only. Microfiche copies only.

During the 7th legislative period (1972/76) of the German Bundestag the Federal Government has repeatedly commented on questions concerning nuclear energy. The present documentation comprises a selection of the most important issues. The collection contains in particular: written and oral answers of the Federal Government to written or oral questions of members of parliament; answers of the Federal Government to major and minor interpellations of fractions or factions; statements of the chancellor, the ministers and permanent secretaries; bills of the Federal Government if they were issued as parliamentary documents or as plenary minutes. The main attention when selecting the documents was drawn to giving complete recording of the statements on the safety of nuclear plants and on radiation protection. Furthermore, the comments on questions concerning nuclear energy were considered both in general and in connection with alternative energy sources. Eventually, the general situation concerning energy could be verified. The selection of documents has certainly not thoroughly remained uninfluenced by subjective decisions. The parliamentary documents and plenary minutes given here are recorded by chronological order. An index of subject headings will facilitate access to all documents. (orig.) 891 HP. (Atomindex citation 10:433999)

GRS-4 **PC A06/MF A01**
Gesellschaft fuer Reaktorsicherheit m.b.H., Garching (Germany, F.R.).
Compilation of Abnormal Events in Nuclear Power Plant, Experimental and Research Reactors for 1966.
H. Piter. Apr 78, 112p
In German.
U.S. Sales Only.

This work is a compilation of abnormal events in reactor facilities for 1966. These abnormal events were collected worldwide and compiled. All these compilations are based on scientific and technical publications, like periodicals, reports and news services. The individual events were classified according to country and, in addition, grouped according to the installation affected, i.e., whether power reactors, experimental reactors, or research reactors. The reporting system, however, was complete only in the United States; in all other countries, apart from the reporting of serious events, it was more or less left to the discretion of the operating organisation to determine the method and the extent of the reporting of abnormal events. This approach has been changed in the meantime, and this is not only the case in the Federal Republic of Germany, where a systematic compilation and evaluation of abnormal events was introduced in 1975. In the year 1966 no abnormal events had occurred which caused any damage to health or property in the vicinity of reactor facilities. (orig.) 891 HP. (Atomindex citation 10:433678)

IAE-2780 **PC A02/MF A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Neutron Spectrum of the Gaseous Cavity Fuel Assembly with an External Heavy Water Moderator in the Energy Range of O < E < 5eV.
D. Yu. Chuvilin. 1977, 19p
In Russian.
U.S. Sales Only.

Integral neutron spectra have been measured in a spherical gaseous fuel assembly mockup with a heavy water moderator in the 1-5 eV energy range. The technique of stationary neutron source (exp 252 Cf) placed in the centre of the cavity filled with BF sub 3 enriched by exp 10 B up to 81.7% is used. Spatial distributions of spectral indexes of exp 164 Dy, exp 151 Eu, exp 115 In, exp 193 Ir and exp 198 Au are tabulated. The measurements have been performed in the BF sub 3 pressure range from 0 to 6 bars which corresponds to the exp 235 U concentrations from 0 to 6.88x10 exp 20 atom/cm exp 3 being critical for the assembly. The measured dependences are compared to the calculated ones, carried out using the SI-5 code written in a 15-group P sub 3 approximation. The experimental and calculated indexes for all investigated indicators (except for europium) are close in value. (Atomindex citation 10:433497)

IAE-2971 **PC A02/MF A01**
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii.
Marginal Thermal-Neutron Peak Fluxes in Systems with Modulation of Reactivity.
N. I. Alekseev, and V. S. Stolypin. 1978, 16p
In Russian.
U.S. Sales Only.

A possibility of obtaining high (including marginal) thermal neutron peak fluxes PHIsub(m) in a light water trap of a pulsed fast reactor with modulation of reactivity has been studied. The dependences of sub(m) on the subcriticality and supercriticality as well as on the supercritical state duration have been calculated on stepped variations of the reactivity. The calculations show that PHIsub(m) of about 7.3x10 exp 18 neutron/cm exp 2 xs with the effective pulse duration of approximately 150 mu c, pulse frequency of approximately 1 Hz and at fuel temperature of approximately 1300 deg C can be obtained with the reactor. The comparative calculations show that sub(m) is 1.5 times higher than that of a booster obtained using a "meson plant" (designs of the booster and the reactor are equivalent). The neutron background between pulses in the reactor is much lower than in the booster, and there is no need for a power injector in the reactor altogether. Meanwhile the maximum attainable PHIsub(m) for the booster and the reactor are the same and equal approximately 2x10 exp 19 neutron/cm exp 2 xs. (Atomindex citation 10:433751)

IDO-1570-T33 **PC A03/MF A01**
Idaho National Engineering Lab., Idaho Falls.
Light Water Reactor Fuel Response During RIA Experiments.
R. K. McCardell, P. E. MacDonald, Z. R. Martinson, and S. K. Fukuda. 1980, 40p
Contract EY-76-C-07-1570

Presented are a discussion of fuel rod thermal response during the RIA, a brief overview of previous test results, a discussion of the results of the PBF tests performed to date, conclusions that can be drawn from these results, and a description of the four tests remaining in the RIA testing program. (ERA citation 05:015810)

IJS-106/5013-77 **PC A03/MF A01**
Institut Jozef Stefan, Ljubljana (Yugoslavia).
Reactivity Measurements.
M. Copic, and J. Spiler. 1977, 32p
In Slovenian.
U.S. Sales Only.

A digital reactivity meter, realized as an off-line Fortran program, the input to which is a record of 500 consecutive values of n(tsub(i)) obtained by on-line program on CDC 1700 from the linear power channel of the TRIGA reactor, has been tested at low powers at which the reactor fuel temperature feedback reactivity is negligible. The accuracy of the reactivity meter is proportional to the square of the product of the sampling interval and the period at which the neutron density changes. So the relative error of the reactivity remains at all operational states below 0.2% at 1 second sampling intervals and even at 3 seconds sampling it does not rises above 2.0%. The meter is useful for measurements of control rod drops into the reac-

tor at sampling intervals of 0.1 sec. The meter sensitivity is 0.5 c/s at 1 sec sampling. (Atomindex citation 10:426810)

INIS-mf-3964 PC **A02**/MF **A01**
Health and Safety Executive, London (England).
Public Information on Nuclear Safety and Incidents at Nuclear Installations in the UK.
R. Gausen, and W. S. Gronow. 1977, 7p CONF-7709126-19
Meeting on regulatory inspection practices in nuclear power plants, Madrid, Spain, 20 Sep 1977.
U.S. Sales Only.

In recent years public interest in the safety aspects of the use of nuclear energy has been increasing in the UK as in other countries. The Government considers public involvement on this subject to be important and has taken action to promote and encourage public debate. As a result of a Government requirement, the Health and Safety Executive (HSE) now publish a quarterly statement which gives particulars of incidents at nuclear installations reported to the HSE under the Nuclear Installations Act 1965, Dangerous Occurrences Regulations and under conditions attached to nuclear site licences granted that Act. The range of incidents covered in the quarterly statement and the present state and background of the public debate on nuclear energy in the UK are described. (Atomindex citation 09:384104)

INIS-mf-3970 PC **A02**/MF **A01**
Statens Kaernkraftinspektion, Stockholm (Sweden).
Practical Experience and Problems in the Inspection Work During Test and Routine Operation of Nuclear Power Plants.
T. Backstroem. 1977, 9p CONF-7709126-18
Meeting on regulatory inspection practices in nuclear power plants, Madrid, Spain, 20 Sep 1977.
U.S. Sales Only.

A brief description is given of the Swedish Nuclear Power Inspectorate (SNPI) and its working methods in the field of licensing procedures and inspection activities. SNPI has introduced a system to be kept continuously informed about the operation of the nuclear power plants. This information is used in the preparation work preceding the inspections. Experience obtained from the inspection activities show that inspection frequency has been lower than planned. Documentation can be improved and that good relations between the authority and the utilities, including the operating personnel, is to the benefit of the nuclear safety. (Atomindex citation 09:384101)

INIS-mf-3973 PC **A02**/MF **A01**
Technischer Ueberwachungs-Verein Baden e.V., Mannheim (Germany, F.R.).
Quality Assurance During Assembling of Nuclear Power Plants According to German Inspection Practices.
M. Bleickert. 1977, 6p CONF-7709126-4
Meeting on regulatory inspection practices in nuclear power plants, Madrid, Spain, 20 Sep 1977.
U.S. Sales Only.

Description of quality assurance during assembling of nuclear power plants practiced in the Federal Republic of Germany. According to the German Law (Atomgesetz) and the postulation of the licencing authorities a large scope of quality control methods are carried out. Responsible for fulfilling the requirements are component-manufacturers as well as system-constructor and authorized inspectors. (Atomindex citation 09:368469)

INIS-mf-3974 PC **A02**/MF **A01**
Junta de Energia Nuclear, Madrid (Spain).
Inspection of Nuclear Power Plants under Construction in Spain.
L. Santoma. 1977, 15p CONF-7709126-8
Meeting on regulatory inspection practices in nuclear power plants, Madrid, Spain, 20 Sep 1977.
U.S. Sales Only.

Brief summary of the situation of the nuclear industry in Spain, in order to better understand the questions involved in the inspection of the Spanish nuclear power plants, as well as the experience acquired, followed by a description of some of the problems which have arisen during the construction phase. Also the problems faced by the Inspection of the Junta de Energia Nuclear are described in order to fulfill the missions entrusted to it. Finally, some recommendations are made in light of the experience had by Spain. (Atomindex citation 09:368473)

INIS-mf-3975 PC **A03**/MF **A01**
Junta de Energia Nuclear, Madrid (Spain).
Inspection During Operation of a Nuclear Power Plant in Spain.
R. Gutierrez Bernal. 1977, 35p CONF-7709126-6
Meeting on regulatory inspection practices in nuclear power plants, Madrid, Spain, 20 Sep 1977.
U.S. Sales Only.

The control and surveillance activities, as well as the operating data and results of the three nuclear power plants presently in operation: Jose Cabrera, Santa Maria de Garona and Vandellos, are summarized. The first two are light-water type, with different pressure and boiling characteristics and the third is of the gas-graphite type. The main aspects, from an inspection point of view, of the experience obtained in these three plants are analyzed. (Atomindex citation 09:368471)

INIS-mf-3977 PC **A02**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
United States Nuclear Regulatory Commission's Vendor Inspection Program.
B. H. Grier. 1977, 6p CONF-7709126-6
Meeting on regulatory inspection practices in nuclear power plants, Madrid, Spain, 20 Sep 1977.
U.S. Sales Only.

The NRC conducts a program of inspection at licensee contractors and vendors to assure that quality assurance programs meet applicable NRC requirements. This inspection program, which was begun in 1965 and restructured in 1974, is discussed. A trial program has recently been initiated to evaluate the use of the ASME N-stam inspection system to supplement NRC inspections. The criteria for NRC acceptance of such a third party inspection system are described in the paper. (Atomindex citation 09:368470)

INIS-mf-3978 PC **A02**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
Public Information Aspects of Nuclear Regulatory Inspection in the United States.
E. Volgenau. 1977, 8p CONF-7709126-10
Meeting on regulatory inspection practices in nuclear power plants, Madrid, Spain, 20 Sep 1977.
U.S. Sales Only.

The public information aspects of the regulation of nuclear power present a unique set of problems. Not only must the regulators communicate often complex technical information to the public, they must also assure the public, the press and the legislative bodies of the adequacy of the regulatory process and the safety of power plant operations. The United States Nuclear Regulatory Commission (NRC), recognizing the importance of a continuing, open dialogue with the public, has placed particular emphasis on informing the public of its operations. NRC's experiences have been both good and bad. On balance, however, the NRC believes it is following the best course by conducting its operations openly and candidly. (Atomindex citation 09:368475)

INIS-mf-3979 PC **A02**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
Inspection of Licensed Nuclear Power Plants in the United States.
H. D. Thornburg. 1977, 23p CONF-7709126-9
Meeting on regulatory inspection practices in nuclear power plants, Madrid, Spain, 20 Sep 1977.
U.S. Sales Only.

Inspection of licensed nuclear power plants in the United States is performed by the Office of Inspection and Enforcement (IE), United States Nuclear Regulatory Commission. IE has several key functions : a) Inspection of licensees and investigation of incidents, occurrences and allegations. b) Detection and correction of safety and security problems. c) Enforcement of rules, regulations, and Commission orders. d) Feedback to the industry and others regarding safety experience. e) Informing the public and others. Major enforcement actions and events involving operating power reactors for the past several years will be summarized. (Atomindex citation 09:368474)

INIS-mf-4085 PC **A02**/MF **A01**
Australian Atomic Energy Commission Research Establishment, Lucas Heights. Engineering Research Div.
Experimental and Numerical Study of Developed Single Phase Axial Turbulent Flow in a Smooth Rod Bundle.
J. D. Hooper. 1977, 8p CONF-770259-2
Conference on heat and mass transfer, Sydney, Australia, Feb 1977.
U.S. Sales Only.

A combined experimental and numerical model of a turbulent single phase coolant, flowing axially along the fuel pins of a nuclear reactor, was developed. The experimental rig represented two interconnected subchannels of a square array at a pitch/diameter ratio of 1.193. Air was the working fluid, and measurements were made of the mean radial velocity profiles, wall shear stress variation, turbulence velocity spectra and intensities. The numerically predicted wall shear distribution and mean velocity profiles, obtained using an empirical two-dimensional mixing length and eddy diffusivity concept to represent fluid turbulence, showed good agreement with the experimental results. (Atomindex citation 09:367903)

INIS-mf-4150 PC **A11**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
Nuclear Questions: Church and Nuclear Energy, Church and Environment, Church and Progress.
W. Hohlfeld. 1977, 230p
In German.
U.S. Sales Only.

This brochure 'nuclear problems' deals with the attitude of the protestant church in the region around the northern Elbe towards further quantitative economic growth, esp. nuclear energy, with the following essays: preaching the Gospel in an environment in danger: the Christian occident and the problems of the third world, facing the problems of exhausted supplies, the role of the prophet, problem of environment - a problem of theology, the political dimension, against ATW, signal Brokdorf, strange effects (defense of the church from unqualified teachings by non-professionals), Christian liberty, church and nuclear energy, violence and robes. (Atomindex citation 09:367759)

INIS-mf-4242 PC **A02**/MF **A01**
Westinghouse Nuclear Espanola, Madrid.
Impact of Instrumentation and Control Requirements on the Design Changes of the Westinghouse "NSSS" Of Almaraz, Lemoniz and Asco.
P. M. Gerini, F. P. Naredo, and D. W. Williams. 1978, 14p CONF-7710184-23
In Spanish.IAEA specialists meeting on the effect of regulatory requirements on nuclear power plant control and instrumentation systems, Madrid, Spain, 4 Oct 1977.
U.S. Sales Only.

For the nuclear power plants Almaraz, Lemoniz and Asco the NSSS set is supplied by Westinghouse. Purchasing contracts were signed in 1971 and projects design took into account the compliance with the regulatory requirements for licensing, issued and standing that time. Since 1971 licensing regulations have been subjected to a deep revision due to the issue of new standards and guides and revision of other affecting altogether the engineering design of nuclear power plants. This situation was reasonably reflected on several consecutive design revisions for the case of the Almaraz, Lemoniz and Asco Nuclear plants. This impact, from the viewpoint of the instrumentation and control context, and referred to the NSSS is analyzed in the report. In particular, attention is paid to the safeguards actuation logic, testing capability and physical separation criteria as contemplated into the regulatory requirements starting from 1971. (Atomindex citation 10:445786)

INIS-mf-4244 PC **A02**/MF **A01**
UKAEA, Risley. Nuclear Power Development Establishment.

Effect of Regulatory Requirements on the Control and Instrumentation System Designer.
J. A. Golder. 1978, 3p CONF-7710184-20
IAEA specialists meeting on the effect of regulatory requirements on nuclear power plant control and instrumentation systems, Madrid, Spain, 4 Oct 1977.
U.S. Sales Only.

The difficulties encountered by the designer of control and protection systems for nuclear plant in attempting to satisfy the large number of imprecise regulations and recommendations which exist are described. The absence of fundamental quantitative safety requirements of international acceptability is deplored and the adoption of a major incident criteria expressed in quantitative terms as the basis for the derivation of target design criteria for protection systems and plant components is suggested. (Atomindex citation 10:426979)

INIS-mf-4245 PC **A02**/MF **A01**
UKAEA.
Nuclear Installations Inspectorate Criteria for Assessing Control and Instrumentation Systems for Nuclear Power Plants.
J. L. Petrie. 1978, 8p CONF-7710184-15
IAEA specialists meeting on the effect of regulatory requirements on nuclear power plant control and instrumentation systems, Madrid, Spain, 4 Oct 1977.
U.S. Sales Only.

The Nuclear Installations Inspectorate is responsible for licensing all civil nuclear power plants in the United Kingdom. The criteria which have been developed within the NII for the assessment of nuclear power plant proposals are described. The philosophy underlying the criteria is outlined and specific criteria are chosen for more detailed discussion. (Atomindex citation 09:408577)

INIS-mf-4247 PC **A02**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Seibersdorf. Forschungszentrum.
Development of a Computerized Operation Manual for Nuclear Power Plants.
H. Roggenbauer. 1978, 13p CONF-7710184-16
IAEA specialists meeting on the effect of regulatory requirements on nuclear power plant control and instrumentation systems, Madrid, Spain, 4 Oct 1977.
U.S. Sales Only.

A problem arose during the licensing work for the reactor protection system (RPS) and the safety systems of the first Austrian nuclear power plant at Zwentendorf. It could have severe impact to the overall safety of the plant and the environment. The first Austrian nuclear power plant has a boiling water reactor with 723 MW(e) power and the installed RPS is a convertional dynamic selfchecking 2 out of 3 relay system. One approach, employing a computer which appeared to be the most suitable for attacking this problem is described. The merits and the obtectives of using a computer are explained. The ideas of how to gradually develop a computerized system which should be an aid to the reactor operator and can be implemented in a already operating plant without any conceptual changes are reflected. (Atomindex citation 09:408578)

INIS-mf-4248 PC **A02**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Design and Quality Assurance of Control and Instrumentation Systems, Licensing Practice in Austria.
P. Fasko. 1978, 7p CONF-7710184-8
IAEA specialists meeting on the effect of regulatory requirements on nuclear power plant control and instrumentation systems, Madrid, Spain, 4 Oct 1977.
U.S. Sales Only.

The practicised way how licensing of control and instrumentation systems is performed in Austria, is related. As there is no national regulations in Austria for licensing nuclear power plants, it tries to adopt international regulations for its own purpose. (Atomindex citation 09:408556)

INIS-mf-4249 PC **A02**/MF **A01**
Comision Nacional de Energia Atomica, Buenos Aires (Argentina). Gerencia de Proteccion Radiologica y Seguridad.
Optimization Criteria for Control and Instrumentation Systems in Nuclear Power Plants.
A. J. Gonzalez. 1978, 23p CONF-7710184-11
In Spanish.IAEA specialists meeting on the effect of regulatory requirements on nuclear power plant control and instrumentation systems, Madrid, Spain, 4 Oct 1977.
U.S. Sales Only.

The system of dose limitation recently recommended by the International Commission on Radiation Protection includes, as a base for deciding what is reasonably achievable in dose reduction, the optimization of radioprotection systems. This paper, after compiling relevant points in the new system, discusses the application of optimization to control and instrumentation of radioprotection systems in nuclear power plants. Furthermore, an extension of the optimization criterion to nuclear safety systems is also presented and its application to control and instrumentation is discussed; systems including majority logics are particularly scrutinized. Finally, eventual regulatory implications are described. (Atomindex citation 09:408561)

INIS-mf-4250 PC **A02**/MF **A01**
Junta de Energia Nuclear, Madrid (Spain). Seccion de Seguridad Nuclear.
Problems About the Analysis of Technical Requirements Compliance in NPPPCI Systems.
M. Perello. 1978, 8p CONF-7710184-14
IAEA specialists meeting on the effect of regulatory requirements on nuclear power plant control and instrumentation systems, Madrid, Spain, 4 Oct 1977.
U.S. Sales Only.

The display of the problems that the analysis of the technical requirements compliance bring along is presented. In the project of nuclear power plants, above all, the influence of national and international standards in the analysis of the adjustment of requirements established by the governments of nuclear safety of the different countries. In the oral presentation greater emphasis is made on the difficulties that the PSAR evaluation brings when the lack of technical standards in the owner country makes necessary the use of other countries rules. (Atomindex citation 09:408576)

INIS-mf-4251 PC **A02**/MF **A01**
Junta de Energia Nuclear, Madrid (Spain).
Some Remarks on Software Reliability.
J. Gonzalez Hernando, and J. Sanchez Izquierdo. 1978, 17p CONF-7710184-10
IAEA specialists meeting on the effect of regulatory requirements on nuclear power plant control and instrumentation systems, Madrid, Spain, 4 Oct 1977.
U.S. Sales Only.

Trend in modern NPPCI is toward a broad use of programmable elements. Some aspects concerning present status of programmable digital systems reliability are reported. Basic differences between software and hardware concept require a specific approach in all the reliability topics concerning software systems. The software reliability theory was initialy developed upon hardware models analogies. At present this approach is changing and specific models are being developed. The growing use of programmable systems necessitates emphasizing the importance of more adequate regulatory requirements to include this technology in NPPCI. (Atomindex citation 09:408560)

INIS-mf-4254 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Services d'Electronique.
International Electrotechnical Commission Standards and French Material Control Standards.
J. Furet, and J. Weill. 1978, 10p CONF-7710184-21
In French.IAEA specialists meeting on the effect of regulatory requirements on nuclear power plant control and instrumentation systems, Madrid, Spain, 4 Oct 1977.
U.S. Sales Only.

There are reported the international standards incorporated into the IEC Subcommitee 45 A (Nuclear Reactor Instrumentation) and the national standards elaborated by the Commissariat a l'Energie Atomique, CEA, Group of normalized control equipment, the degree of application of those being reported on the base design, call of bids and exploitation of nuclear power plants. (Atomindex citation 10:445782)

INIS-mf-4255 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Services d'Electronique.
Some Notes Relative to the Impact of the Regulation for the Control of Nuclear Power Plants About the Definition, Development and Installation of Instrumentation sub-Assemblies.
J. Furet. 1978, 15p CONF-7710184-22
In French.IAEA specialists meeting on the effect of regulatory requirements on nuclear power plant control and instrumentation systems, Madrid, Spain, 4 Oct 1977.
U.S. Sales Only.

Application of regulatory requirements into the instrumentation and control context for nuclear power plants has indeed an important impact toward the definition, development and installation of the equipment involved. Furthermore these requirements lead to a doubtless effect on the actual development itself of nuclear stations and on their operation safety. Author makes the presentation of this subject through two items; firstly some remarks concerning the role of the instrumentation and control as a whole, the operating experience of nuclear stations and the perspective in developing countries are outlined. Secondly, considerations about the regulatory requirements impact are presented. (Atomindex citation 10:445783)

INIS-mf-4257 PC **A02**/MF **A01**
EPTISA-GHESA-TRSA-Empresarios Agrupados, Madrid (Spain).
Regulation on Control Systems Tests.
J. Grau, and J. M. Navarro. 1978, 24p CONF-7710184-24
In Spanish.IAEA specialists meeting on the effect of regulatory requirements on nuclear power plant control and instrumentation systems, Madrid, Spain, 4 Oct 1977.
U.S. Sales Only.

Requirements under regulation applicable to the testing of control systems and controlled equipments in the case of USA nuclear projects are examined. They are reviewed, in particular, the following standards and criteria: 10 Code of Federal Regulations 50, Appendix A, General Design Criteria 20 and 21; IEEE Standards 279 and 308; IEEE Standard 338; US Regulatory Guides 1.22 and 1.118. (Atomindex citation 10:445787)

INIS-mf-4262 PC **A02**/MF **A01**
Compagnie Generale d'Entreprise Electrique - Alsthom, Levallois-Perret (France).
Coincidencd Logic Reactor Protection System with Automatic and Permanent Testing.
1978, 5p CONF-7710184-27
In French.IAEA specialists meeting on the effect of regulatory requirements on nuclear power plant control and instrumentation systems, Madrid, Spain, 4 Oct 1977.
U.S. Sales Only.

Within the context of sodium-cooled fast reactors, the CGEE Alsthom enterprise, under consulting for Novatome, has been engaged with the development of an specific protection system for emergency shutdown situations. System described has been conceived on several stages according to the general organization shown on figure I of the Annex, in such a manner that the exigences and recommendations from the safety regulatory authorities are respected and, at the same time, it is assured a significant reactor operation availability without an spureous rod drop. As an example, a selection of principles, rules and criteria currently applied to the development of a system of this kind is reminded. (Atomindex citation 10:445805)

INIS-mf-4266 PC **A02**/MF **A01**
Societe Franco-Americaine de Constructions Atomiques, Courbevoie (France).
Automatic Testing of Logic Protection Systems.
G. Semenof. 1978, 12p CONF-7710184-26

In French.IAEA specialists meeting on the effect of regulatory requirements on nuclear power plant control and instrumentation systems, Madrid, Spain, 4 Oct 1977.
U.S. Sales Only.

Regulatory requirements concerning the conceptual arrangements of periodic tests of reactor protection systems and difficulties encountered in the conception of testing equipment are examined. This presentation is followed by a review of a protection logic system, fail-safe designed, and associated tester. Advantages of automatic tests are finally discussed. (Atomindex citation 10:445801)

INIS-mf-4282 MF **A01**
Sao Paulo Univ. (Brazil). Escola Politecnica.
Burn Up Determination of IEAR-1 Fuel Elements by Non Destructive gamma Ray Spectrometry Method.
A. J. Soares. 1977, 108p
In Portuguese.Thesis.
U.S. Sales Only. Microfiche copies only.

Measurement of nuclear fuel burn up by non destructive gamma ray spectrometry is discussed, and results of such measurements, made at the Instituto de Energia Atomica (IEA), are given. Specifically, the burn up of an MTR (Material Testing Reactor) fuel element removed from the IEAR-1 swimming pool reactor in 1958 is evaluated from the measured Cs-137 activity, which gives a single 661,6 keV gamma ray. Due to the long decay time of the test element, no other fission decay product activity could be detected. Analysis of measurements, made with a 3" x 3" NaI(Tl) detector at 330 distinct points of the element, showed the total burn up to 3.3 +--+ 0.8 mg. This is in agreement with a calculated value. As the maximum temperature of IEAR-1 fuel elements is of the order of 40 exp 0 C, migration effects of Cs-137 was not considered, this being significant only at fuel temperature in excess of 1000 exp 0 C. (Atomindex citation 09:383812)

INIS-mf-4442 PC **A02**/MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation (ZAED), Eggenstein-Leopoldshafen (Germany, F.R.).
Nuclear Energy: General Aspects of Risk Assessment and Public Acceptance.
H. Fischerhof. 1977, 9p CONF-7710201-1
In German.Nuclear Inter Jura 1977, Florence, Italy, 2 Oct 1977.
U.S. Sales Only.

No abstract available.

INIS-mf-4512 PC **A02**/MF **A01**
Friends of the Earth (Australia), Melbourne.
Nuclear Power Experience in Japan: Exposing the Myth.
N. Barrett. Jun 77, 8p
U.S. Sales Only.

The author proposes that over the last four years the dreams of Japan's nuclear establishment have been severely shaken. Because of widespread public opposition, the nuclear program has fallen further and further behind schedule. Poor efficiency figures have also contributed to a scaling down of electricity production targets. Uranium stocks are said to be sufficient to last well into the 1990's and as a consequence Japan's optimism in seeking to purchase Australian uranium is completely unfounded and based on the belief that the current nuclear malaise is only temporary. (Atomindex citation 10:426506)

INIS-mf-4691 MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.).
Project Nuclear Safety (PNS).
1978, 351p
In German.
U.S. Sales Only. Microfiche copies only.

The annual report of the nuclear safety project (PNS) describes the work of the participating institutes in the fields of 1) safety and environmental protection in nuclear power plants, 2) safety and environmental protection in reprocessing plants, and 3) reduction of secondary damage. (Atomindex citation 10:426491)

INIS-mf-4736 PC **A02**/MF **A01**
Stichting Energieonderzoek Centrum Nederland, The Hague.
Summary of Activities July 1977 - July 1978.
Jul 78, 8p
U.S. Sales Only.

Brief sketches are first given of the current energy situation in the Netherlands and of the governmental research and development policies in this field. Against this background the main developments in the Netherlands Energy Research Foundation ECN are given for the period between 1st July 1977 - 30th June 1978. Information on organization and staffing applies to the latter date. The financial figures at the end are taken from the latest annual report (in Dutch) and refer to the calender year 1977. (Atomindex citation 10:431153)

INIS-mf-4767 MF **A01**
Nuclear Regulatory Commission, Washington, DC.
Operational Safety Experience Reporting in the United States.
R. A. Hartfield. 1978, 10p CONF-781022-68
Meeting on nuclear power reactor safety, Brussels, Belgium, 16 Oct 1978.
U.S. Sales Only. Microfiche copies only.

Licensees of nuclear power plants in the United States have many reporting requirements included in their technical specifications and the code of federal regulations, title 10. The Nuclear Regulatory Commisson receives these reports and utilizes them in its regulatory program. Part of this usage includes collecting and publishing this operating experience data in various reports and storing information in various data systems. This paper discusses the data systems and reports on operating experience published and used by the NRC. In addition, some observations on operating experience are made. Subjects included are the Licensee Event Report (LER) Data File, the Operating Unit Status Report (Gray Book), Radiation Exposure Reports, Effluents Reports, the Nuclear Plant Reliability Data System, Current Events, Bulletin Wrapups and Annual Summaries. Some of the uses of the reports and systems will be discussed. The Abnormal Occurence Report to the US Congress is described and discussed. (Atomindex citation 10:445228)

INIS-mf-4773 PC **A02**/MF **A01**
Brussels Univ. (Belgium).
Cassandre: A 2D Multigroup Diffusion Benchmark Code for Fast Reactors Power Excursions Analysis.
M. Bardiaux, J. Devooght, E. Mund, I. Saragossi, and P. Dugnoille. 1978, 13p CONF-781022-64
Meeting on nuclear power reactor safety, Brussels, Belgium, 16 Oct 1978.
U.S. Sales Only.

CASSANDRE uses a four group 2D diffusion model with finite elements up to quintic order. Time dependence involves a generalization of the qasistatic approximation with a different amplitude function for each group. The coupled shape and ampiitude equations are cast into integral form and solved iteratively using a Newton - SOR algorithm. A simplified thermohydraulics feedback is incorporated. A great number of parametric studies involving different time steps and number of Newton iterations show that power transients accuracy near prompt critical may be strongly affected by reactivity and shape function convergence. (Atomindex citation 10:445175)

INIS-mf-4774 MF **A01**
Sandia Labs., Albuquerque, NM.
Light Water Reactor Safeguards System Evaluation.
G. B. Varnado, D. M. Ericson, Jr., H. A. Bennett, B. L. Hulme, and S. L. Daniel. 1978, 12p CONF-781022-71
Meeting on nuclear power reactor safety, Brussels, Belgium, 16 Oct 1978.
U.S. Sales Only. Microfiche copies only.

A methodology for assessing the effectiveness of safeguards systems was developed in this study and was applied to a typical light water reactor plant. The relative importance of detection systems, barriers, response forces and other safeguards system components was examined in extensive parameter variation studies. (Atomindex citation 10:445286)

INIS-mf-4776 MF **A01**
Westinghouse Electric Nuclear Energy Systems Europe, Brussels (Belgium).
Seismic Reevaluation of Existing Nuclear Power Plants.
J. C. Hennart. 1978, 8p
U.S. Sales Only. Microfiche copies only.

The codes and regulations governing Nuclear Power Plant seismic analysis are continuously becoming more stringent. In addition, design ground accelerations of existing plants must sometimes be increased as a result of discovery of faulting zones or recording of recent earthquakes near the plant location after plant design. These new factors can result in augmented seismic design criteria. Seismic reanalysis of the existing Nuclear Power Plant structures and equipments is necessary to prevent the consequences of newly postulated accidents that could cause undue risk to the health or safety of the public. This paper reviews the developments of seismic analysis as applied to Nuclear Power Plants and the methods used by Westinghouse to requalify existing plants to the most recent safety requirements. (Atomindex citation 10:445229)

INIS-mf-4780 PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Education and Public Acceptance of Nuclear Power Plants.
G. Delcoigne. 1978, 16p CONF-781022-65
Meeting on nuclear power reactor safety, Brussels, Belgium, 16 Oct 1978.
U.S. Sales Only.

After a short review of the origins of the nuclear controversy in the United States, its spread in recent years in Europe and in North America will be examined. The situation in Eastern Europe and less industrialized countries will also be analysed, as well as the ups and downs of some of the arguments. Some of the effects and consequences which have arisen on a national level and possible lessons for the future will be drawn, both at national and international levels. (Atomindex citation 10:445206)

INIS-mf-4806 PC **A02**/MF **A01**
Decree No. 77-1233 of 10 November 1977 Setting Up a Council for Information on Nuclear Electricity Generation.
1977, 1p
In French.
U.S. Sales Only.

This Decree sets up a Council for information on nuclear electricity generation directly under the authority of and appointed by the Prime Minister. It has 18 members who include, inter alia, mayors of the communes concerned by nuclear power plant siting, representatives of nature and environmental protection associations, science academicians and economics, energy and communications experts. The Council's purpose is to ensure that the public has access to information on nuclear electricity generation from the technical, health, ecological, economic and financial viewpoints. It advises the Government on the public's conditions of access to information and proposes methods for its dissemination. (Atomindex citation 10:446275)

INIS-mf-4810 PC **A02**/MF **A01**
Denmark-Federal Republic of Germany: Agreement Regulating the Exchange of Information on the Construction of Nuclear Installations Along the Border.
1977, 3p
U.S. Sales Only.

This Agreement signed on 4 July 1977 lays down that the Contracting Parties will inform each other about all nuclear installations constructed along the common border. Nuclear installations within the meaning of the Agreement are installations for the production, processing, reprocessing, manufacture or fission of nuclear fuels. The information to be communicated includes plans and decisions on siting; construction and operation of such installations and relevant documents. The Agreement provides for consultation between the Parties on safety aspects and lays down in detail all the conditions for communication of information. (Atomindex citation 10:446274)

INIS-mf-4813 MF **A01**
Nuclear Energy Agency, Paris (France).
OECD Halden Reactor Project. 17. Annual Report 1976.
1978, 71p
U.S. Sales Only. Microfiche copies only.

This report summarizes the activities of the OECD Halden Reactor Project for the year 1976. The main items reported on are: a) the process supervision and control which have focused on core monitoring and control, and operator-process communication; b) the fuel performance and safety behavior which have provided data and analytical descriptions of the thermal, mechanical and chemical behavior of fuel under various operating conditions; c) the reactor operations and d) the administration and finance. (Atomindex citation 10:441857)

INIS-mf-4829 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Indian Experience in Performance of Light Water Reactor Fuel Elements.
J. K. Bahl, P. R. Roy, D. N. Sah, K. C. Sahoo, and K. S. Sivaramakrishnan. 1978, 5p CONF-781196-2
IAEA international symposium on water reactor fuel element fabrication with special emphasis on its effect of fuel performance, Prague, Czechoslovakia, 6 Nov 1978.
U.S. Sales Only.

Under a programme to assess the performance of fuel elements of Tarapur Atomic Power Station, post-irradiation examination has been carried out on some elements. The examination has revealed two modes of fuel element failure - stress corrosion cracking and internal hydriding. Nodular corrosion was observed to be severe in the initial load fuel elements, while it was not significant in the reload fuel elements. Fretting corrosion was observed at spacer grid locations in the initial load fuel elements. Available data collected by non-destructive testing of more than 3,800 initial load fuel elements from 109 defective fuel assemblies have been analysed. The regions of fuel assembly having high failure rates have been identified. (Atomindex citation 10:445817)

ITEF-68(1978) PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Numerical Method of Optimizing Spatial Characteristics of Heterogeneous Reactors.
V. M. Malofeev. 1978, 21p
In Russian.
U.S. Sales Only.

A numerical method of optimizing spatial characteristics of a reactor is developed on the basis of the heterogeneous reactor difference equations. Formulae of the perturbation theory and corresponding conjugate equations are obtained in the form convenient for practical use. An iterative method to solve the equations, based on the Chebyschev technique of accelerating convergence, is proposed. The algorithm is put into practice in the MARC code (FORTRAN, BESM-6 computer). (Atomindex citation 10:433514)

Juel-Spez-11 PC **A16**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Programmgruppe Systemforschung und Technologische Entwicklung.
Uses and Examples of Application of Nuclear Power in North Rhine-Westphalia with Special Regard to Its Contribution to a Structural Improvement.
B. Jehle. Jun 78, 351p
In German.Thesis.
U.S. Sales Only.

As examples of the implementation of nuclear energy, the alternative potentials for meeting electricity demand and for coal gasification in North Rhine-Westphalia have been studied, with particular applications in the chemical and iron and steel industries of this state. The effects on competitiveness and choice of sites for these industries and on hard coal production have been quantified. The political significance of implementing nuclear energy for improving the economic structure depends not only on these individual economic effects but also on the contribution to growth and the effects which spread from these industries throughout the whole regional economy, which have also been quantified. The development of the chemical, iron and steel and coal industries can affect over 30% of the entire labor force of North Rhine-Westphalia; thus for these industries energy-economic forces have appreciable structural effects. (Atomindex citation 10:433985)

Juel-1528 PC **A04**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Sicherheitsforschung.
NAKOGAS-1, a Computer Code for the Evaluation of Transient Temperature- and Flow Distributions in Pebble-Bed-Reactors after Failure of Forced Coolant Flow.
I. Hoefer, W. Klumpp, A. Badur, R. Finken, and G. Meister. Aug 78, 58p
In German.
U.S. Sales Only.

The code NAKOGAS-1 has been developed for the evaluation of the thermodynamic behaviour of pebble bed reactors in the case of failure of forced cooling. It is preferently designed for evaluation of flow and temperature fields which may aise under natural convection conditions but it is also suited for natural convection with superimposed forced convection. The code models the reactor core and the surrounding structure two-dimensional in cylindrical geometry. In addition those components of the primary circuit which may influence the gas convection are included. The pebble bed is modelled as a quasi homogenous 2-phase medium with energetic coupling between both phases. Energy transfer by conduction, convection and radiation is taken into account. The presented report contains a description of the mathematical model underlying the programme and of the numerical method being used. The code structure is described and results of a typical sample case are illustrated. (Atomindex citation 10:438034)

JAERI-M-7356 PC **A06**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Experimental Study on Reactivity Measurement in Thermal Reactor by Polarity Correlation Method.
H. Yasuda. Nov 77, 112p
In Japanese.
U.S. Sales Only.

Experimental study on the polarity correlation method for measuring the reactivity of a thermal reactor, especially the one possessing long prompt neutron lifetime such as graphite or heavy water moderated core, is reported. The techniques of reactor kinetics experiment are briefly reviewed, which are classified in two groups, one characterized by artificial disturbance to a reactor and the other by natural fluctuation inherent in a reactor. The fluctuation phenomena of neutron count rate are explained using F. de Hoffman's stochastic method, and correlation functions for the neutron count rate fluctuation are shown. The experimental results by polarity correlation method applied to the beta /l measurements in both graphite-moderated SHE core and light water-moderated JMTRC and JRR-4 cores, and also to the measurement of SHE shut down reactivity margin are presented. The measured values were in good agreement with those by a pulsed neutron method in the reactivity range from critical to -12 dollars. The conditional polarity correlation experiments in SHE at -20 cent and -100 cent are demonstrated. The prompt neutron decay constants agreed with those obtained by the polarity correlation experiments. The results of experiments measuring large negative reactivity of -52 dollars of SHE by pulsed neutron, rod drop and source multiplication methods are given. Also it is concluded that the polarity and conditional polarity correlation methods are sufficiently applicable to noise analysis of a low power thermal reactor with long prompt neutron lifetime. (Atomindex citation 10:426819)

JAERI-M-7539 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Energy Deposition in NSRR Test Fuels.
N. Ohnishi, S. Tanzawa, T. Tanzawa, T. Kitano, and S. Okazaki. Feb 78, 70p
In Japanese.
U.S. Sales Only.

Interpretation of fuel performance data collected during inpile testing in the NSRR requires a knowledge of the energy deposition or enthalpy increase in each sample tested. The report describes the results of absolute measurement of fission products and contents of uranium in irradiated test fuels which were performed to determine the energy deposition. (Atomindex citation 10:427233)

JAERI-M-7624 MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Mark II Containment 1/6-Scale Pressure Suppression Test Program: Data Report. I. (Pool Swell Tests: Runs 106, 111, 114, 153, 160, 161, 162, 164, 165).
Y. Kukita, K. Namatame, M. Okazaki, and M. Shiba. Apr 78, 93p
In Japanese.
U.S. Sales Only. Microfiche copies only.

The Mark II Containment 1/6-Scale Pressure Suppression Test Program of JAERI started in December 1976, sponsored by the Japanese BWR owners' group, to investigate the thermohydraulic response of a BWR Mark II pressure suppression system during a posulated loss-of-coolant accident with a 1/6-scale test facility. A total of 23 runs of pool swell and steam condensation tests were performed from January to June 1977 for the BWR owners' group, and after the termination of the contract, the test facility was transferred to JAERI. The present report provides a brief description of the test facility and instrumentation, test matrix and raw data from 9 runs of air-blowdown pool swell tests carried out from January to August 1977 as supplement to the runs performed under the contract. Qualitative interpretations of the data and plans for the future work are also presented. (Atomindex citation 10:437997)

JAERI-M-7627 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Systems Analysis by Fault Tree Method. II. System Reliability Analysis Code FALCOM.
K. Suzuki, and K. Ogura. May 78, 52p
In Japanese.
U.S. Sales Only.

It is important to introduce reliability engineering to the design of a nuclear power plant in order to improve its availability. The computer code FALCOM developed is described which is for analysing effects of preventive and corrective maintenances by FAULT TREE METHOD. Calculated with the code are the following: (1) unavailability of a system with parts maintained correctively or preventively, and (2) classification of minimal-cut-sets and analysis of system reliability. Results of two example calculations are also given. (Atomindex citation 10:431139)

JAERI-M-7705 PC **A05**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Experimental Results of the Linear Heat Rating Capsule 72F-12J.
M. Mizuho, K. Sezaki, R. Oyamada, Y. Nomura, and M. Shimizu. Jun 78, 77p
In Japanese.
U.S. Sales Only.

This report describes experimental results with 72F - 12J capsule, the first step of the linear heat rating capsule project. Linear heat rating is one of the most important in irradiation experiment of fuel specimens. However, the techniques of estimation are not established yet. The project is proceeding in a joint working group. For 72F - 12J, i.e. a NaK bonding capsule containing a long stacked slightly enriched UO sub 2 pin, the linear heat ratings are in good agreement between the following: (1) Q sub(cal) (calculation) = 388 W/cm, (2) W sub(CF) (critical facility mock-up experiment) = 394 W/cm, and (3) Q sub(GEN) (thermocouple measurement - GENGTC calculation) = 388 W/cm. (Atomindex citation 10:445985)

JAERI-M-7751 PC **A08**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Description of the THYDE-P Code. Preliminary Report of Methods and Models.
Y. Asahi. Jul 78, 175p
U.S. Sales Only.

This paper is a preliminary report about the methods and the models applied to a computer code named THYDE-P which is concerned with thermal-hydraulic transients of a PWR plant following a large or small area break of a primary coolant system pipe, generally referred to as a loss-of-coolant accident (LOCA). The THYDE-P code deals not only with blowdown phase, but also with reflooding phase. What characterizes the THYDE-P code is its entirely new model for the primary loop network. The code user information and the programming detail are not included in this report, but in a future documentation. (Atomindex citation 10:445844)

JAERI-M-7817 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Systems Analysis by Fault Tree Method. III. Reliability Analysis of VHTR'S Reserve Cooling System.
K. Suzuki, and K. Ogura. Aug 78, 31p
In Japanese.
U.S. Sales Only.

Reliability of VHTR's reserve cooling system (RCS) has been studied by FAULT TREE method. Obtained from this study are the following conclusions: (1) Adequate maintenance greatly improves reliability of RCS under standby condition. An optimum annual maintenance frequency is given as a function of maintenance duration. (2) Unreliability of the whole RCS in continuous operation is determined by circulating water pump unit and emergency electric power system in RCS. (3) Failure rate during standby and start-up failure probability are key parameters in choosing the combination of maintenance and operating mode to increase RCS reliability. Future works in RCS design and reliability analysis are also indicated from the view point of reliability engineering. (Atomindex citation 10:445283)

KAT-3-77 PC **A02**/MF **A01**
Cologne Univ. (Germany, F.R.).
Is Nuclear Power Economically Efficient.
H. Michaelis. 1977, 6p CONF-770323-10
In German.Reactor congress, Mannheim, F.R. Germany, 29 Mar 1977.
U.S. Sales Only.

The power generation costs for a coal-fired power plant and a nuclear power plant with PWR are calculated and compared for spring 1977. There was a cost advantage for the nuclear power plant of 3.7 DPF/KWh for 7000 hours of operation/year and of 2.8 DPF/KWh for 5000 hours of operation/year. The limit of rentability is 3000 hours of operation/year. As the cost of fossil fuels will increase considerably in the future, the cost advantage of nuclear power plants can only increase. (Atomindex citation 10:431069)

KBS-TR-105 PC **A03**/MF **A01**
Kaernbraenslesaekerhet, Stockholm (Sweden).
Neutron Induced Activity in Fuel Element Components.
N. Kjellbert. Mar 78, 30p STUDSVIK-SM-78/4
In Swedish.
U.S. Sales Only.

A thorough investigation of the importance of various nuclides in neutron-induced radioactivity from fuel element construction materials has been carried out for both BWR and PWR fuel assemblies. The calculations were performed with the ORIGEN computer code. The investigation was directed towards the final storage of the assembly components and special emphasis was put to the examination of the sources of carbon-14, cobalt-60, nickel-59, nickel-63 and zirconium-93/niobium-93m. It is demonstrated that the nuclides nickel-59, in inconel and stainless steel, and zirconium-93/niobium-93m, in Zircaloy, are the ones which constitute the very long term radiotoxic hazard of the irradiated materials. (Atomindex citation 10:438311)

KFK-EXT-8/78-5 PC **A04**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung.
Assessment of Structural Dynamics Problems in Nuclear Reactor Safety.
R. Liebe. Oct 78, 56p
In German.
U.S. Sales Only.

The paper discusses important physical features of structural dynamics problems in reactor safety. First a general characterization is given of the following problems: Containment deformation due to pool-dynamics during BWR-blowdown; behavior of the core internals due to PWR-blowdown loads; dynamic response of a nuclear power plant during an earthquake; fuel element deformation due to local pressure pulses in an LMFBR core. Several criterias are formulated to classify typical problems so that a better choise can be made both of appropriate mathematical/numerical as well as experimental techniques. The degree of physical coupling between structural dynamics and fluid dynamics is discussed in more detail since it requires particular attention when selecting problem-oriented methods of solution. Some examples are given to illustrate the application and to compare advantages and disadvantages of several numerical methods. Then description is given of experimental techniques in structural dynamics and typical problem areas are identified. Finally some results are presented concerning the fuel element deformation problem in LMFBRs and from the general considerations some important conclusions are summarized. (orig.) 891 RW 892 AP. (Atomindex citation 10:433164)

KFK-2585 PC **A04**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik.
NOASYS, A System for on-Line Noise Analysis.
H. Massier. Jul 78, 57p
In German.
U.S. Sales Only.

This report describes NOASYS, a versatile noise analysis system for digital on-line signal processing. The system based on a minicomputer, was originally developed for the analysis of noise signals from nuclear reactors. NOASYS computes various statistical functions e.g. cross- und autocorrelation functions and power spectral densities resp., which may be used for reactor diagnosis and malfunction detection. The system processes up to 16 analog signals with a maximum sampling frequency of 100 kcps (1 channel). The processing of the sampled data is done by a number of software tasks, which may be called from a teletype or linked together for specific measuring programs. The standard configuration contains the often used processing routines e.g. Fast Fourier Transform, complex multiplication, summation etc. In addition NOASYS may be extended by users own tasks (in Assembler or Fortran) to fit for specific applications. (orig.) 891 HP. (Atomindex citation 10:433516)

KFK-2712 PC **A03**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik.
Heat Transfer Measurements of Internally Heated Liquids in Cylindrical Convection Cells.
G. Fieg. Oct 78, 28p
In German.
U.S. Sales Only.

In hypothetical reactor accidents, the thermohydraulic behaviour of core melts heated by the afterheat must be analyzed. For this purpose model experiments have been performed to study the stationary, natural convective heat transfer of internally heated fluids in cylindrical convertion cells investigating also the influence of geometry (aspect ratio) as well as of difference thermal wall conditions on to the heat transport characteristics. Axial temperature profiles, local heat flux densities at the vertical walls and their dependence, on the external Rayleigh number ar in detail reported, besides the Nusselt vs Rayleigh correlations for the aspect ratios HID=1 and 0,25. The results of these experiments are compared, as for ar possible, with existing thermohydraulic codes and simpler model asoumptions like the zone-model of Baker et. al. and after experimental verification, be used to study realistic PAHR situations. Velocity measurements by means of Laser-Doppler-Method yield information about the flow characteristics near the vertical walls and within the central part of the convecting fluid. (Atomindex citation 10:437691)

KURRI-TR-159 MF **A01**
Kyoto Univ., Osaka (Japan). Research Reactor Inst.
Low Temperature Irradiation Facility at Kyoto University Reactor (KUR). Its New Refrigeration System.
K. Atobe, M. Okada, H. Yoshida, H. Kodaka, and K. Miyata. 1977, 38p
In Japanese.
U.S. Sales Only. Microfiche copies only.

A new refrigeration system has been substituted to the low temperature irradiation facility at KUR instead of the previous one, since April in 1975. The model 1204 CTi He liquifier was designed to be modified for the refrigerator with the capacity of 30 watts at 10 K. The refrigeration capacity of 38 watts at 10 K was defined using a special cryostat and transfer-tubes, and the lowest temperature of about 18 K was measured using the irradiation loop without reactor operation. The reconstructed facility enables us to hold the many specimens simultaneously in the sample chamber of the irradiation loop at about 25 K during reactor operation of 5 MW. The irradiation dose has been reached about 6.6 x 10 exp 16 n sub(f)/cm exp 2 and 6.1 x 10 exp 17 n sub(th)/cm exp 2 with the normal reactor operation cycle of up to 77 hours. The stable operation condition of the machine and the special safety system for the refrigeration system enable us to maintain easily the facility with a constant operation condition for such a long time irradiation. Many kinds of low temperature neutron irradiation experiments are carried out using the facility, which techniques are partially reported. (Atomindex citation 10:427229)

KURRI-TR-160 PC **A03**/MF **A01**
Kyoto Univ., Osaka (Japan). Research Reactor Inst.
Surveying Studies on the Geology and Ground around the Construction Site of High Flux Reactor in Research Reactor Institute of Kyoto University.
M. Fukui, and K. Katsurayama. 5 Oct 77, 37p
In Japanese.
U.S. Sales Only.

In the construction of a reactor container and its enclosure building, it is important to investigate the geology and ground of the destination site. This report is concerned to the outline of the site survey which has been conducted under the plan of the construction of High Flux Reactor in Research Reactor Institute of Kyoto University. The survey was carried out about drawing up the stratgraphical map based on the sounding of boring at 10 positions near the destination site, the estimation of the ground supporting force, the dip of the ground and the stability of stratgraphy. The main results are as follows. (1) the stratgraphy near the destination site is inclined by a few degrees of an angle to the north-west direction, and consists of the layered soils of sand and clay which are a few meter depth, (2) the ground under the basis of the container is firm as the N-values are greater than 50, though it is loose near the surface soil, (3) the supporting force of the ground under the basis was estimated as about 400 t/m exp 2 , (4) the dip of the ground is small enough to disregard for the design load of 20 t/m exp 2 , and the disparity dip can not be foreseen as the depth of clayey layer is nearly uniform, (5) the sliding of the ground along the stratgraphy is not expected as the inner rubbing angle of soil is greater than the gradient of the stratgraphy. (Atomindex citation 10:426542)

ND-R-90(W) PC **A02**/MF **A01**
UKAEA, Risley (England). Nuclear Power Development Labs.
Criterion and Mechanism for Power Ramp Defects.
A. Garlick, and J. G. Gravenor. Feb 78, 14p
U.S. Sales Only.

The problem of power ramp defects in water reactor fuel pins is discussed in relation to results recently obtained from ramp experiments in the Steam Generating Heavy Water Reactor. Cladding cracks in the defected fuel pins were similar, both macro- and micro structurally, to those in unirradiated Zircaloy exposed to iodine stress-corrosion cracking (scc) conditions. Furthermore, when the measured stress levels for scc in short-term tests were taken as a criterion for ramp defects, UK fuel

modelling codes were found to give a useful indication of defect probability under reactor service conditions. The likelihood of sticking between fuel and cladding is discussed and evidence presented which suggests that even at power a degree of adhesion may be expected in some fuel pins. The ramp defect mechanism is discussed in terms of fission product scc, initiation being by intergranular penetration and propagation by cleavage when suitably orientated grains are exposed to large dilatational stresses ahead of the main crack. (Atomindex citation 10:427106)

NIIAR-P-10(304) PC **A02**/MF **A01**
Nauchno-Issledovatel'skii Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR).
Experimental and Analytical Study on Boiling Coolant Parameter Distribution Using a Fuel Assembly Mockup.
A. I. Gavrilin, and A. M. Begunova. 1977, 22p
In Russian.
U.S. Sales Only.

Described are the results of the distribution experimental study of the actual volumetric steam content in height and cross-section of the two-cell heated channel simulating the neighbouring cells of the reactor fuel element cluster. The parameters have been studied within the following range: p=3 MPa, thermal load - 400 - 1400 kW/m exp 2 , mass speed of the coolant - 1000 - 3700 kg/C x m exp 2 . The curves showing distribution of the steam content over the channel chords have been plotted . The average values of the steam content in the cells and in the channel as a whole have been determined. Given are the results of calculations of the experimental conditions in accordance with the programs similar to the COBRA, HAMBO and BUNDLE-2 codes. For comparative analysis, three thermal-physical models of the thermodynamically unstable two-phase flows have been used in the program. The difference between the theoretical and experimental results has been analyzed. It is shown that the heat content in the intercellular flows is not equal to the mean heat content of the flow in the donor cell but depends on the flow conditions. (Atomindex citation 10:433387)

NUREG/CR-0849-V-4 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Safeguards Material Control and Accounting Program: Quarterly Report July-September 1979,
Donald R. Dunn. May 80, 26p UCRL-52715-79-4
See also Volume 3, NUREG/CR-0849-V-3.

Activity for the quarter July-September 1979 in the Material Control Safeguards Evaluation Program, is summarized. Progress was made in developing a computer-based methodology for identifying vulnerabilities in Material Control and Accounting (MCA) systems in nuclear fuel-cycle facilities. This progress took the form of deliverables reporting work completed in the Structured Assessment Approach methodology, and a Phase II Safeguards Vulnerability Assessment Methodology (SVAM) application to G.E. Vallecitos Nuclear Center. Moreover, SVAM was developed into a computer-based assessment strategy called Safeguards Vulnerability Analysis Program (SVAP). Work continued in assisting the NRC to develop the forthcoming MCA upgrade rule. Other areas of activity reported on here are aggregated systems model development, adversary modeling, and components performance.

NUREG/CR-1120-V-2 PC **A06**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Seismic Safety Margins Research Program (Phase I). Volume 2.
Progress rept. no. 6, 1 Oct 79-31 Mar 80,
R. D. Bailey. May 80, 110p
See also Volume 1, NUREG/CR-1120-V-1.

The document is a progress report on the Seismic Safety Margins Research Program (SSMRP) covering the period October 1, 1979 through March 31, 1980. The report gives a general description of the program, together with financial summaries and individual project details. Each project is summarized to show accomplishments, schedules, milestones and completion dates, budget and expenditures, and any concerns that may affect the project.

NUREG/CR-1154-V-1-2 PC **A03**/MF **A01**
General Electric Co., San Jose, CA.
BWR Blowdown/Emergency Core Cooling Fourteenth Quarterly Progress Report, April 1-June 30, 1979. Volume 1, Number 2,
D. L. Galyardt. May 80, 29p GEAP-21304-14
Contract NRC-04-76-215
Sponsored in part by Electric Power Research Inst., Palo Alto, CA.

Blowdown/Emergency Core Cooling work completed in the second quarter of 1979 (April 1, 1979 through June 30, 1979) is summarized. During the second quarter a test plan was developed for the balance of the BD/ECC1A test phase and hardware and instrumentation changes were made to the Two-Loop Test Apparatus. Verified data was released for an average power/no Emergency Core Cooling test (Test 6406, Run 3) which was conducted as a repeat of the reference test without ECC. Data analysis continued during the second quarter and the key results of these analyses are discussed.

NUREG/CR-1162 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Equipment and Procedures Used for Preparing Specimens from Prompt Burst Energetics Experiments,
Sherwood F. Duliere. May 80, 21p SAND-79-2265

Post-test examinations are required to aid in the evaluation of results from Prompt Burst Energetics Study experiments. In order to perform these examinations the test packages must be disassembled in a radiation shielded, non-oxidizing environment. This report describes the equipment and procedures used to accomplish the disassembly and to prepare specimens suitable for optical and scanning electron microscopic examinations.

NUREG/CR-1225 PC **A10**/MF **A01**
National Academy of Public Administration, Washington, DC.
Major Alternatives for Government Policies, Organizational Structures, and Actions in Civilian Nuclear Reactor Emergency Management in the United States.
Technical rept. 14 Aug-31 Dec 79.
Jan 80, 203p
Contract NRC-04-79-210

The National Academy of Public Administration identified and evaluated alternatives for governmental policies, organizational structures, and actions in civilian nuclear reactor emergency management. It reviewed present policies and practices in civilian nuclear reactor emergency management, selected experiences and practices of governmental agencies other than the Nuclear Regulatory Commission, and industries other than the nuclear power industry, and to identify alternatives to the present nuclear emergency system. The Academy performed this work using a staff operating under the oversight of a select panel. Part I of this report summarizes the conclusions of the panel on the issues. Part II is a staff paper analyzing some of the issues and alternatives, and setting forth recommendations. Part III is a staff paper describing the present civilian nuclear reactor emergency planning and response 'system' in the United States.

NUREG/CR-1239 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
MASFLO: A Computer Code to Calculate Mass Flow Rates in the Thermal-Hydraulic Test Facility (THTF).
Technical rept.,
M. D. White. May 80, 34p ORNL/NUREG/TM-268
Contract W-7405-ENG-26

This report documents a modular data interpretation computer code. The MASFLO code is a Fortran code used in the Oak Ridge National Laboratory Blowdown Heat Transfer Program to convert measured quantities of density, volumetric flow, and momentum flux into a calculated quantity: mass flow rate. The code performs both homogeneous and two-velocity calculations. The homogeneous models incorporate various combinations of the Thermal-Hydraulic Test Facility instrumented spool piece turbine flow meter, gamma densitometer, and drag disk readings. The two-velocity calculations also incorporate these instruments, but in models developed by Aya, Rouhani, and Popper. Each subroutine is described briefly, and input instructions are provided in the appendix along with a sample of the code output.

NUREG/CR-1267 PC **A18**/MF **A01**
Sandia Labs., Albuquerque, NM.
Independent Verification Testing: Analyses of Alternatives for Conducting Independent Verification Testing of Environmentally Qualified Safety-Related Equipment.
Technical rept.,
Lloyd L. Bonzon, and W. R. Rutherford. May 80, 405p SAND-78-2411

This study provides an analysis of alternatives for conducting independent verification testing of environmentally qualified safety-related equipment which is required to operate in nuclear plant safety systems. Three major alternatives were costed and compared: (1) NRC dedicated test facility; (2) NRC contracts for testing to existing test laboratories; (3) NRC review and witnessing of vendor tests. To formalize the evaluation, eleven specific criteria were identified against which the alternatives were compared. None of the alternatives singly show clear advantage; but in the dual combinations, an 'optimal' alternative emerges when alternatives 1 and 3 are considered in union. This study also illustrates the magnitude and immediacy of the equipment environmental qualification issue. It recommends that dedicated NRC staff be assigned to qualification programs review and that other NRC staff continue this study to define, coordinate, and implement an optimal alternative.

NUREG/CR-1292 PC **A06**/MF **A01**
Sandia Labs., Albuquerque, NM.
Two-Phase Jet Loads. Fiscal Year 1979 Annual Report,
David Tomasko. May 80, 112p SAND-80-0267

The consequences of a pipe break must be considered in detail in the design of a nuclear power plant system. Pipe restraints must be installed to prevent large displacements resulting from thrust forces, and jet deflectors must be engineered to preclude additional effluent damage on the system. Over-design of the system must be avoided due to safety and economic considerations. The two-phase jet load program at Sandia National Laboratories is endeavoring to develop an improved approximate engineering model to characterize two-phase jets emanating from breaks in a typical PWR piping system in order to more realistically predict loads and flows. This annual report discusses the work completed on two-phase jets in FY79. Topics include two-phase jet experimental data, computer code evaluation for two-phase jet analyses, and current and future two-phase jet load work.

NUREG/CR-1335 PC **A04**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Irradiation Effects upon Selected Ceramic Cements and Ceramic Insulated Wires for Radiation-Resistant Transducers,
Merlin E. Yancey, and P. Victor Kelsey. May 80, 60p EGG-2019
Contract DE-AC07-76IDO1570

Several high temperature ceramic cements and ceramic insulated wires were irradiated. The fast fluence ranged between 1.38 to 1.75 x 10 to the 20th power nvt, and the thermal fluence ranged between 2.90 to 3.85 x 10 to the 20th power nvt. Changes in the structural and bonding characteristics of the materials were noted. The evaluation indicated that most of the materials irradiated could be used in a nuclear environment.

NUREG/CR-1339 PC **A06**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Independent Assessment of the Steady State Fuel Rod Analysis Code FRAPCON-1,
E. Thomas Laats, G. Bob Peeler, and Nora R. Scofield. Jun 80, 120p EGG-2020
Contract DE-AC07-76IDO1570

The predictive capabilities of the steady state fuel rod behavior program, FRAPCON-1, have been independently assessed. FRAPCON-1 code predic-

tions of fuel behavior are compared with experimental data for test rods and with predictions from the FRAP-S3 code for commercial design rods. The code-to-data comparisons are used to assess the accuracy of fuel rod thermal, pressure, deformation, and corrosion models under steady state operating conditions. The code-to-code comparisons are used to identify the effects of model differences between FRAPCON-1 and the previously assessed fuel behavior code, FRAP-S3. On the basis of results of these studies, conclusions are given regarding present model capabilities and future development needs.

NUREG/CR-1343 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Qualification Testing Evaluation Program Light-Water Reactor Safety Research.
Quarterly rept. Apr-Jun 79,
Lloyd L. Bonzon, Roger L. Clough, Kenneth T. Gillen, and Edward A. Salazar. May 80, 39p
SAND-80-0276
See also NUREG/CR-0970.

This report presents progress and research in the Qualification Testing Program (QTE) for the April-June 1979 quarter. Under Task 1, the principal effort was devoted to the initiation of verification tests of the qualification of Browns Ferry Unit 3 connector assemblies. Radiation and thermal-aging experiments were completed, and a superheat test capability demonstrated in preparation for the accident simulation test phase. Under Task 3, significant effort was directed toward analyses of experiments that indicated a strong synergism for polymer degradation in a radiation-thermal environment. The balance of the quarterly effort centered on ongoing projects. Within the methodologies task, the test-facility upgrade and preparation for the connector tests received primary emphasis. Within the radiation-source task, effort continued on the development of a 'best-estimate' LOCA-radiation signature and the drafting of a 'simulator-adequacy' assessment report. Within the accelerated-aging task, the primary emphasis was on fire-retardant aging tests, continued combined-environments testing of electrical cable materials, and the evaluation of ambient-aged electrical cable samples.

NUREG/CR-1346 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Advanced Two-Phase Flow Instrumentation Program Quarterly Progress Report for October-December 1979,
K. G. Turnage, C. E. Davis, R. L. Anderson, and G. N. Miller. May 80, 41p ORNL/NUREG/TM-382
Contract W-7405-eng-26
See also report for Jul-Sep 79, NUREG/CR-1212.

A primary objective of the Advanced Two-Phase Flow Instrumentation (ATPI) Program is to develop reliable coolant level sensors for in-core use in light-water power reactors. Two concepts are being pursued concurrently: heated thermocouple (HTC) arrays and ultrasonic techniques. Detectors are being designed, fabricated, and tested before proceeding to the design of prototype instruments for in-core or in-reactor use. The emphasis of this task is to develop reliable level detectors which can be retrofitted into existing plants and incorporated into new reactor design. A feasibility study of the use of an enhanced vortex shedding flowmeter for making measurements in two-phase flow is concluded that the vortex shedding mechanism is severely limited for two-phase flow application.

NUREG/CR-1359 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Fabrication of Sensors for High-Temperature Steam Instrumentation Systems,
A. J. Moorhead, M. B. Herskovitz, C. S. Morgan, J. J. Woodhouse, and R. W. Reed. May 80, 57p ORNL/NUREG-65
Contract W-7405-eng-26

A series of instruments is under development at ORNL for measurment of two-phase (steam and water) flow parameters in out-of-reactor safety tests that simulate a loss-of-coolant accident in a pressurized water reactor. To enable these instrument sensors to be built, the authors have developed a unique ceramic-to-metal seal system, which will withstand relatively short-time exposure to 800C (1470F) steam and remain leaktight after repetitive thermal transients of 300C/s (540F/s). Thirteen highly complex instrumented guide tube assemblies, each containing a number of these ceramic-to-metal seals, have been fabricated. Procedures were also developed for (1) laser welding of sensor subassemblies into the tube wall, (2) induction brazing of four stainless-steel-sheathed thermocouples through the tube wall, and (3) furnace brazing of the eight triaxial cables, four thermocouples, and a vent tube where they passed through the upper end of the guide tube.

NUREG/CR-1361 PC **A04**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Drag Devices for Two-Phase Mass Flow Measurements,
James L. Anderson. May 80, 58p EGG-2025
Contract DE-AC07-761D01570

Results are presented from testing a number of full-flow drag devices in steady-state air-water mixtures and transient steam-water mixtures for the purpose of obtaining two-phase mass flow measurements. Modeling methods for obtaining mass flow rates are discussed, along with the effects of two-phase flows on the drag coefficient of full-flow, multihole drag plates. Test results indicate that for applications in small piping, a multihole drag plate with a flow blockage of 23% provided the greatest accuracy of the devices tested, resulting in a normalized standard deviation of 2.5% for two-component mixtures. For low density, high velocity flows (such as all gas and annular mist flows) the drag coefficient of the drag device increased from its constant all water value, reflecting the effects of compressibility. Results are presented for eight different drag devices tested in air-water mixtures. Transient steam-water tests were performed to assess the transient performance of a prototype drag plate and to determine with what accuracy the mass exiting the system could be measured. Results from four partial blowdown tests are presented.

NUREG/CR-1381 PC **A09**/MF **A01**
Sandia National Labs., Albuquerque, NM.
A Methodology for Evaluating Safeguards Capabilities for Licensed Nuclear Facilities - Final Report,
Harold A. Bennett, M. Teresa Olascoaga, Alan Sicherman, and Gary Smith. May 80, 177p
SAND-80-7028
Prepared in cooperation with Woodward-Clyde Consultants, San Francisco, CA.

This report describes work performed in the development and implementation of an evaluation methodolgy. This methodology was developed to aid the NRC in its evaluation of fixed-site physical protection system performance relative to the Physical Protection Upgrade Rule, 10 CFR Part 73.45.

NUREG/CR-1400 PC **A03**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Quarterly Technical Progress Report on Water Reactor Safety Programs Sponsored by the Nuclear Regulatory Commission's Division of Reactor Safety Research, January-March 1980,
L. J. Ybarnondo. May 80, 40p EGG-2031
Contract DE-AC07-76IDO1570
See also report dated Mar 80, NUREG/CR-1203.

Water reactor research performed by EG & G Idaho, Inc. during January through March 1980 is reported. The Semiscale Program conducted four small break loss-of-coolant tests to aid in evaluation of Semiscale system heat losses and provide data to the NRC for evaluation of small break analytical model capability to properly predict the effects of primary coolant pump operation during a small break loss-of-coolant accident. The Loss-of-Fluid Test Experimental Program conducted the second nuclear experiment in its Small Break Test Series L3. The Thermal Fuels Behavior Program completed a power-cooling-mismatch/reactivity initiated accident test in the Power Burst Facility reactor, a fission gas release test in the Halden Reactor in Norway, and the second in a series of internal fuel rod fill gas composition tests. The Code Development and Analysis Program progressed in the development of advanced computer codes (FRAPCON-2 and FRAP-T6) for predicting the steady state and transient behavior of light water reactor fuel rods. The Code Assessment and Applications Program characterized a data sample for fuel code assessment and initiated PWR and BWR analysis to identify and analyze accident sequences. Engineering Support Projects progressed in development of flow measurement instrumentation in the 3-D Experiment Project and in advanced instrumentation development, with the application of a heated differential thermocouple liquid level system.

NUREG/CR-1430 PC **E04**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Test PCM-5 Fuel Rod Materials Behavior,
Deborah K. Kerwin. May 80, 136p EGG-2033
Contract DE-AC07-76IDO1570
Includes 3 MF inserts (24X).

Test PCM-5 was the first nine-rod bundle test in the Power-Cooling-Mismatch (PCM) Test Series. The test objectives were to evaluate the behavior of the center rod operated in an environment typical of a commercial reactor rod subjected to a PCM transient, and to investigate the potential for rod-to-rod interactions. The center rod experienced about 215s of high temperature (about 1500K) film boiling and did not fail. Six surrounding rods operated in stable film boiling for varying times, and two rods failed during operation. Test PCM-5 fuel rod materials behavior, analyzed from post-irradiation examination results, is presented in this report. Posttest bundle and individual fuel rod appearances are discussed. Fuel rod axial, circumferential, and radial temperature profiles are presented. Rod bowing during operation is discussed, and bow direction reversal on quench is explained from structural analyses. Cladding and fuel microstructural and chemical changes are presented. Fuel rod failures and failure mechanisms are discussed.

NUREG-0660-V-1 PC **A17**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
NRC Action Plan Developed as a Result of the TMI-2 Accident. Volume 1.
May 80, 400p
See also NUREG-0660-V-2.

The Action Plan provides a comprehensive and integrated plan for all actions judged necessary by the Nuclear Regulatory Commission to correct or improve the regulation and operation of nuclear facilities based on the experience from the accident at the Three Mile Island, Unit 2, nuclear facility and the official studies and investigations of the accident.

NUREG-0660-V-2 PC **A09**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
NRC Action Plan Developed as a Result of the TMI-2 Accident. Volume 2.
May 80, 189p
See also NUREG-0660-V-1.

The Action Plan provides a comprehensive and integrated plan for all actions judged necessary by the Nuclear Regulatory Commission to correct or improve the regulation and operation of nuclear facilities based on the experience from the accident at the Three Mile Island, Unit 2, nuclear facility and the official studies and investigations of the accident. The tables included in this volume list the recommendations from the various organizations and task forces investigating the accident at Three Mile Island. The tables are annotated to provide easy references to the associated parts of the Action Plan in Volume 1. The tables are also annotated to provide a shorthand indication of how the various recommendations are treated in the Action Plan.

PB80-180649 PC **A03**/MF **A01**
Model Interstate Scientific and Technical Information Clearinghouse, Denver, CO.
Nuclear Power Reactors: An Overview of Selected Issues,
Rhett D. Speer, Greg H. Lazarus, and Holly W. Higgins. Apr 79, 40p NSF/RA-790308
Grant NSF-ISP78-21314

A brief overview of the more immediate issues of nuclear power plants affecting state legislatures is provided. Four areas are discussed: radiological emergency planning; decommissioning; Federal/

state controls; and liability. The section on radiological emergency planning outlines the lead role of the Nuclear Regulatory Commission (NRC), and lists Federal agencies with supportive responsibilities. The report of the General Accounting Office (GAO), released at the time of the Three Mile Island incident, is reviewed. Nuclear facilities which have requested NRC's inspection cadre to observe emergency drills from 1975-1978 are listed. The section on decommissioning defines the term and explains financial issues, unresolved issues, and the existing criteria for decommissioning with respect to reactors and fuel cycles. A digest of nuclear reactor decommissionings is presented in tabular form. The discussion of Federal/state controls sketches the background, lists issues, and outlines the extent of Federal/state control with respect to land use, generation, sale or transmission of electric power, economic considerations, environmental impacts, emergency procedures, employee safety, and transportation. The concluding section on liability discusses implications of the Price-Anderson Indemnity Act of 1957. Appendices include references, a glossary of terms, a list of reactor types and locations, and a list of Federal agency radiation authorities.

SAND-80-0002 PC **A07**/MF **A01**
Sandia Labs., Albuquerque, NM.
Containment and Surveillance Equipment Compendium.
F. O. Luetters. Feb 80, 128p
Contract EY-76-C-04-0789

The Containment and Surveillance Equipment Compendium contains information sections describing the application and status of seals, optical surveillance systems, and monitors for international safeguards systems. The Compendium is a collection of information on equipment in use (generally by the IAEA) or under development in the US in diverse programs being conducted at numerous facilities under different sponsors. The Compendium establishes a baseline for the status and applications of C/S equipment and is a tool to assist in the planning of future C/S hardware development activities. The Appendix contains design concepts which can be developed to meet future goals. (ERA citation 05:015020)

STUDSVIK-BL-78-2 PC **A03**/MF **A01**
Aktiebolaget Atomenergi, Studsvik (Sweden).
Fission Product Migration in Intact Fuel Rods. S176 Experiments 1-5: Fission Product Deposits on Clad Specimens and Their Thermal Stability.
W. Blackadder, R. Forsyth, K. Malen, and Bengt-Aake Nilsson. Mar 78, 36p
U.S. Sales Only.

This report is the fifth of a group which present the results obtained during the first 5 experiments in the S176 series of irradiation experiments. The aim of this series is to provide informtion on the distribution of fission products in intact irradiated fuel rods, both within the UO sub 2 fuel and on the inside of the Zircaloy clad. Fuel rods, previously irradiated to appreciable burnups in the Aagesta R3 reactor, after cooling, are re-irradiated in the Studsvik R2 test reactor for short periods to build up significant inventories of short-lived fission products of interest. Examination of sections of fuel and clad is performed within a short time after removal from the reactor. (Atomindex citation 10:433642)

STUDSVIK-BL-78-26 MF **A01**
Aktiebolaget Atomenergi, Studsvik (Sweden).
Fission Product Migration in Intact Fuel Rods. S178 Experiments 4-6: Fission Product Volatility at 1200 Deg C.
W. Blackadder, R. Forsyth, K. Malen, B. Aa. Nilsson, and C. Wikstroem. Aug 78, 53p
U.S. Sales Only. Microfiche copies only.

In order to investigate the possible volatilization of fission products such as caesium, iodine and tellurium during an hypothetical LOCA intact irradiated fuel rods have been heated up to 1200 deg C. The volatility of caesium and iodine was lower than expected. Only at temperatures of 1100-1200 deg C could we detect axial migration of caesium. No iodine reached the plenum even when most of the rod was at 1200 deg C. (Atomindex citation 10:437961)

STUDSVIK-BL-78-27 PC **A02**/MF **A01**
Aktiebolaget Atomenergi, Studsvik (Sweden).
Fuel Model Studies. Comparison of a Model for Creep under LOCA Conditions with Recent Experimental Results. Partial Report.
K. Malen, and J. Kilter. Jul 78, 22p
U.S. Sales Only.

A previously developed model for Zircaloy creep under LOCA conditions with steam is compared with recent experimental results. (Atomindex citation 10:436670)

STUDSVIK-BL-78-31 PC **A03**/MF **A01**
Aktiebolaget Atomenergi, Studsvik (Sweden).
Fuel Model Studies. Comparison of Our Present Version of GAPCON-THERMAL-2 with Results from the EPRI Code Comparison Study. Partial Report.
K. Malen, and L. Jansson. Aug 78, 39p
U.S. Sales Only.

Runs with our present version of GAPCON-THERMAL-2 have been compared to results from the EPRI code comparison study. Usually also our version of GAPCON predicts high temperatures, 100-300 K or 10-15% higher than average code predictions and experimental results. The well-known temperaturegas release instability is found also with GAPCON. In this case one identifies the gas release limits 1400 deg C and 1700 deg C as instability points. (Atomindex citation 10:437998)

STUDSVIK-MC-78/277 PC **A02**/MF **A01**
Aktiebolaget Atomenergi, Studsvik (Sweden).
Analysis of Fission Products in the Cooling Water System of the R2-Reactor after Fuel Element Failure. 3. Fuel Element Failure under the Period of Aug 1977 to Apr 1978.
P. Aagaard. Aug 78, 25p
In Swedish.
U.S. Sales Only.

Water samples from 14 fuelelement failure events have been analyzed. The leaking varies a lot, quantitatively and qualitatively. The measurements are presented in 14 tables. (Atomindex citation 10:438084)

STUDSVIK-RA-78-2 PC **A17**/MF **A01**
Aktiebolaget Atomenergi, Studsvik (Sweden).
High Temperature Reactors Status 1977.
R. Ekholm, J. Bosaeus, G. Carleson, R. Gelin, and K. Jirlow. Mar 78, 390p
U.S. Sales Only.

The objective of this report is to summarize the current state-of-the-art of HTR technology as part of follow-up studies of the development of advanced fission reactor systems. These studies have been performed at AB Atomenergi since fiscal year 1975/76 and are financed by governmental funds for energy R and D. In this report emphasis is given to the following main aspects of the HTR development: - a survey of the major HTR - R and D programmes; - the description of HTR technology including remaining development problems and uncertainties; - the analysis of the safety and environmental characteristics of the HTR systems; - the analysis of the incentives for the introduction of various HTR types. The report contains also information kindly provided directly by experts from several organisations developing the HTR-systems. (Atomindex citation 10:430765)

WAPD-TM-1434 PC **A05**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Measurement of Quality in Two-Phase Flow around Tube Bundles.
C. L. Williams. Feb 80, 88p
Contract EY-76-C-11-0014

Experiments have been conducted on probes for determining the secondary side quality within tube bundles which simulate the two-phase flow heat exchangers of pressurized water reactor plants. The testing was performed with a steam-water mixture of known quality flowing around unheated horizontal and vertical tubes. The probes operated by extracting low quality samples and indicating the bulk-stream's quality via relative concentrations of a chemical tracer. The tests showed satisfactory probe performance for indicated qualities up to 0.25 for the vertical tube simulator and up to 0.40 for the horizontal tube simulator. (ERA citation 05:015749)

18J. Reactor Materials

AED-Conf-77-498-008 MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Manufacture of Heavy Reactor Components with Particular Consideration to Quality Assurance.
H. Clausmeyer, and H. Kreppel. 1977, 25p
CONF-7709147-13
Meeting on construction and operation management of a nuclear power plant, Karlsruhe, F.R. Germany, 5 Sep 1977.
U.S. Sales Only. Microfiche copies only.

The use of adequate quality assurance measures is one of the most important prerequisites for the manufacture of reactor components. Nature and extent of the quality assurance system at present adopted in the Federal Republic of Germany are illustrated, using the manufacture of a reactor pressure vessel as an example. The system comprises quality organization, planning of all quality assurance measures, quality surveillance through all stages of manufacture and documentation of quality attained. (Atomindex citation 09:383385)

BARC-1003 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Cation Exchange Separation of Uranium from Thorium.
R. T. Chitnis, K. G. Rajappan, S. V. Kumar, and M. N. Nadkarni. 1979, 6p
U.S. Sales Only.

Cation exchange studies were carried out to prepare separation scheme for exp 233 U from thorium in the tail end purification of exp 233 U in the "Thorex Process". The studies involved: (1) collection of equilibrium data for thorium as well as uranium at varying HNO sub 3 concentrations, (2) determination of the breakthrough capacity of the exchanger for thorium and uranium and (3) preparation of the flow sheet for obtaining exp 233 U with as little thorium contamination as possible. Based on these studies a column has been designed which can be operated at higher through puts so that the final purification of exp 233 U is achieved at the process rate. Two purification runs are demonstrated. (Atomindex citation 10:493847)

BARC-668 MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Studies on Application on Airlift in Fuel Reprocessing Engineering.
A. N. Prasad, G. R. Balasubramanian, and K. Ranganathan. 1977, 9p
U.S. Sales Only. Microfiche copies only.

The experiments have been conducted to study the possibility of using airlift for: (1) metering the radioactive fluids by metering the prime air used and (2) transport of these fluids. It is found that airlift can be used for metering directly or a part of a metering system. It can transport radioactive fluids e.g. concentrated plutonium solutions. It can be adopted to transfer complete solutions between tanks at the same level. The problem of entrainment of liquid by air can be sufficiently reduced by introducing suitable de-entrainers. The major advantage is the absence of any moving parts and its wider flow rate ranges. It is, thus, a valuable tool for a fuel reprocessing engineer. (Atomindex citation 10:445570)

BARC-991 MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Studies on the Effect of Temperature and Complexing Agents on the Stripping of Uranium in Purex Process.
A. Ramanujam, M. Venkatesan, V. Gopalakrishnan, J. A. Kazi, and S. V. Kumar. 1979, 13p
U.S. Sales Only. Microfiche copies only.

Using a twelve stage mixer settler, counter current studies have been carried out on the stripping of uranium from 30% TBP/SST under conditions corresponding to Purex process final uranium purification cycle. The improvement in the stripping performance obtained with 0.01M nitric acid as scrub at approximately 45deg C is compared with those obtained by using 0.3M acetic acid adjusted to pH 3.0. These studies reveal that while dealing with

organic feeds having approximately 110 g/1 uranium and low free acidity, stripping with 0.01M HNO sub 3 at approximately 45deg C leads to a better performance. For these feeds, stripping at room temperature with pH adjusted acetic acid yields results which compare well with those obtained by 0.01M nitric acid at approximately 45deg C. This stripping efficiency of acetic acid improves further when the stripping is carried out at approximately 45deg C and shows a marginal advantage over stripping with 0.01M nitric acid at the same temperature, leading to a better stripping profile. When the organic feeds contain 80 g/1 uranium with approximately 0.2M free acidity, stripping with acetic acid at room temperature and with 0.01M nitric acid at approximately 45deg C gives similar results. The overall effectiveness of these techniques for stripping uranium from organic feeds having 80-110 g/1 uranium concentrations follows the order 0.01M HNO sub 3 < 0.3M acetic acid adjusted to pH 3.0, < 0.01M HNO sub 3 at approximately 45deg C < 0.3M acetic acid (at pH .3) at approximately 45deg C. (Atomindex citation 10:481767)

DOE/TIC-11087 PC **A02**/MF **A01**
Babcock and Wilcox Co., Apollo, PA. Nuclear Materials Div.
FFTF Driver Fuel Pellets: Typical Pellet Lot Data.
13p
Contract EY-76-C-02-3109

Quality assurance data for FFTF reactor fuel pellets are presented. (ERA citation 05:015797)

EUR-5892 PC **A18**/MF **A01**
Commission of the European Communities, Luxembourg.
Experimental Determination of Neutron Capure Cross-Sections of Structural Materials for Fast Reactors Integrated over the Intermediate Energy Region. I. Description of Experiments.
S. Tassan. 1978, 401p
In Italian.
U.S. Sales Only.

The report is a selection of technical documents related to the performance of the collaboration contracts 029-71 and 110-73 PIPGI, among AGIP NUCLEARE SpA, CNEN-Centro di Calcolo (Bologna Italy) and JRC-Ispra Establishment, for the experimental determination of neutron capture cross-sections of structural materials for fast reactors (Fe, Ni, Cr, etc.) integrated over the intermediate energy region. The chapters of this first volume of the report are: description of the experiment; feasibility studies related to the test medium; theoretical calculation for the definition of the main experimental parameters; a-priori experimental error analysis. (Atomindex citation 10:422660)

IEA-523 PC **A02**/MF **A01**
Instituto de Energia Atomica, Sao Paulo (Brazil). Centro de Engenharia Quimica.
Study of the Discontinuous Dissolution of Uranium Oxides.
L. A. O. Bueno, B. Floh, and J. A. de Araujo. Dec 78, 17p
In Portuguese.
U.S. Sales Only.

Dissolution studies of UO sub 2 and U sub 3 O sub 8 particles and pellets in nitric acid were carried out to find the best flowsheet conditions for treatment of irradiated materials. All experiments were accomplished with unirradiated oxides at room- and boiling point temperature of the nitric acid solutions, the acid molarity ranging from 1 up to 12M in stoichiometric-and (100% up to 300%) excess conditions. The UO sub 2 (10g) and U sub 3 O sub 8 (10g) are easily dissolved (10 and 50s), respectively, at boiling point of 6M nitric acid solution. At the same conditions compacted pellets are dissolved in 29 min (U sub 3 O sub 8 =5g) and in 330 min (UO sub 2 =20g). (Atomindex citation 10:481762)

INIS-mf-4826 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Reactivity Prediction of Uniform PuO sub 2 -UO sub 2 Fuelled Lattices and Pu(NO Sub 3) sub 4 Solutions in Light Water.
P. Mohankrishnan, and H. C. Huria. 11p
U.S. Sales Only.

A theoretical analysis of the reactivities of the experimentally measured uniform light water moderated and reflected PuO sub 2 in UO sub 2 lattices and Pu(NO sub 3) sub 4 solutions is presented here. The mixed oxide single rod lattices are homogenised by the use of multigroup integral transport theory and diffusion theory is used for the cylindrical core calculations. The cross-sections are derived from the WTIS library. The homogeneous spherical Pu(NO sub 3) sub 4 solutions are analysed by discrete ordinate transport theory. Due to the small size of these criticals, it is necessary that one dimensional core calculations also be performed with a cross-section energy group structure which can represent neutron slowing down and thermalisation at the core reflector interface accurately. Due to the absence of such core calculation in the BNWL analyses of the mixed oxide lattices, the agreement of or predictions for these lattices with measurement is considered to be more satisfactory. These reactivity predictions are found to agree generally within +- 0.6% of measurements for the mixed oxide lattices and within 1% for the solution system. (Atomindex citation 10:445714)

INIS-mf-4832 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
PECITIS-II, A Computer Program to Predict the Performance of Collapsible Clad UO sub 2 Fuel Elements.
A. K. Anand, K. Anantharaman, and V. Sarda. 1978, 11p
U.S. Sales Only.

The Indian power programme envisages the use of PHWRs, which use collapsible clad UO sub 2 fuel elements. A computer code, PECITIS-II, developed for the analysis of this type of fuel is described in detail. The sheath strain and fission gas pressure are evaluated by this method. The pellet clad gap conductance is calculated by Ross and Solute model. The pellet thermal expansion is calculated by assuming a two zone model, i.e. a plastic core surrounded by an elastic cracked annulus. (Atomindex citation 10:446327)

INIS-mf-4835 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Design Criteria for Confidence in the Manufacture of BWR Fuel Rods.
K. Anantharaman, S. Basu, A. K. Anand, and S. K. Mehta. 7p
U.S. Sales Only.

Based on the experience of fuel manufacture for BWR type reactors in India, the parameters which need stringent quality control, are discussed. The design specifications of the fuel rods as well as the cladding material and tubes are reported. The defect mechanisms to be taken into account and the fuel failure in reference to the variation of mechanical properties of the cladding are also described. (Atomindex citation 10:445816)

NUREG/CR-0808 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
On the Corrosion Adequacy of the 2 1/4 Cr-1Mo Steel for LMFBR Steam Generation System Service.
Critical literature survey,
G. E. Zima. May 80, 72p PNL-2795

The focus of this review is on the long-term serviceability of 2 1/4-1 Mo steel under the waterside environmental conditions presented in the steam generator of an LMFBR commercial scale plant. The basic question related to material behavior is to what extent the water side physico-chemical environment will affect the favorable performance of a given material under operating experience. In present light water reactors, the steam generator corrosion problems in part are attributable to complex interactions between the localized secondary environment and the mechanical design of the components (i.e., tube/tube support crevice, tube/tubesheet crevice, flow pattern, etc.) in the steam generating system.

NUREG/CR-1344 PC **A08**/MF **A01**
Argonne National Lab., IL.
Embrittlement Criteria for Zircaloy Fuel Cladding Applicable to Accident Situations in Light-Water Reactors: Summary Report,
H. M. Chung, and T. F. Kassner. May 80, 170p
ANL-79-48

The effect of high-temperature oxidation on the thermal-shock, impact, and ductility properties of Zircaloy cladding has been evaluated to establish more quantitative embrittlement criteria that can be used to determine the margin of performance of emergency-core cooling systems (ECCS's) in light-water-reactors (LWR's). The mechanical response of the cladding was determined under thermal-shock conditions typical of hypothetical LOCA situations in LWR's. Failure maps for fracture of the cladding by thermal shock were developed relative to the maximum oxidation temperature and various time-dependent oxidation parameters. In addition to the thermal-shock characteristics, the capability of Zircaloy cladding to withstand other loads during the reflood stage of a LOCA transient as well as anticipated loads during fuel handling and transport of heavily oxidized fuel assemblies was evaluated.

NUREG/CR-1392 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
Evaluating Strength and Ductility of Irradiated Zircaloy, Task 5.
Quarterly progress rept. Apr-Jun 79,
L. M. Lowry, A. J. Markworth, J. S. Perrin, and M. P. Landow. May 80, 41p BMI-2049
See also NUREG/CR-0982.

The Lot 4 material (Oconee I, Three Cycle) was received, visually examined and gamma scanned. The four rods were Babcock and Wilcox (B&W) fuel rods irradiated in the Oconee I reactor, sectioned at B&W, and shipped to Battelle Columbus Laboratories (BCL) in the shipping cask BCL-4. Specimens for tensile, expanding mandrel, tube-burst, and transient heating burst tests were prepared from the Lot 4 rods. Burst tests were conducted using unirradiated Oconee I archive fuel rod cladding material. Additional burst tests were conducted using Lot 2 (Oconee I, One Cycle) irradiated Zircaloy fuel rod cladding. Also, burst tests were conducted using Lot 3 (Oconee I, Two Cycle) Zircaloy fuel rod cladding. A comparison of Oconee I archive, one cycle, and two cycle tube-burst test results is included. Modeling studies are continued using a number of constitutive equations fitted to the BCL tensile data using a nonlinear-regression-analysis computer code developed at Battelle and based on the Marquardt algorithm.

WAPD-TM-1308 PC **A05**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Thoria Powder Process Development (LWBR Development Program).
C. R. Hutchison, and R. Lloyd. Oct 79, 87p
Contract EY-76-C-11-0014

The development program to identify the critical parameters for the process of converting thorium nitrate solution into thoria powder is described. Thorium oxalate hexahydrate is precipitated from the reaction of thorium nitrate solution with oxalic acid. The resulting thorium oxalate hexahydrate slurry is filter pressed into a cake which is air calcined to form thoria powder. Changes in the critical processing parameters such as free nitric acid content of the thorium nitrate solution, precipitation temperature, and calcining temperature altered the thoria powder characteristics, and thus its capability for being fabricated into fuel pellets. The objective of the powder preparation effort was to obtain thoria powders which could be formed by conventional ceramic fabrication techniques into thoria and thoria-urania pellets of high density and high integrity having a nearly uniform large grain structure. (ERA citation 05:015767)

WCAP-9471 MF **A01**
Westinghouse Nuclear Energy Systems, Pittsburgh, PA.
Remote Mixed Oxide Fabrication Facility Development. Volume 1: Reference Facility.
R. M. Horgos, and M. L. Masch. May 79, 670p
Contract EY-76-C-06-1830
Microfiche copies only.

The general objective of Task 201 is to present a conceptual design of a remotely operated and maintained fuel fabrication facility. This document, the first of three volumes, describes the reference facility as based on the current design of the Westinghouse Recycle Fuels Plant modified to include the objectives of the Fuels Refabrication and Development (FRAD) program. Included are descrip-

tions of the facility design basis and layout, the manufacturing process, and the auxiliary and support services. (ERA citation 05:017430)

18K. Reactor Physics

FEI-737 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Algorithm of the Solution for a Two-Dimensional Reactor Equation in the Two-Group Diffusion Approximation.
N. I. Buleev, and V. P. Ginkin. 1977, 13p
In Russian.
U.S. Sales Only.

An algorithm for calculating a reactor in the two-group diffusion approximation in (x,y)- and (r,z)-geometries is described. The difference equations satisfying the balance relationship are derived using the integral method. In order to find a solution of the five-point equations the internal iterative method is used that is a sort of the pertial factorization scheme. The scheme employed ensures a high convergence rate of the iterative process. The "FACTOR" computer code is written in the FORTRAN language for the ES-1030 computer and employs only the operative memory. (Atomindex citation 10:433496)

IAE-2776 PC **A03**/MF **A01**
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii.
Complex Program for BESM-6 Calculation of One-Dimensional Nuclear Reactors by Means of the Multigroup-Constant Computer Library (ARADAR).
E. S. Glushkov, and N. A. Petushkova. 1977, 30p
In Russian.
U.S. Sales Only.

Described is the ARADAR program used to solve one-dimensional multigroup equations of the reactor in the P sub 1 -approximation. The program is written in the FORTRAN-ZERN language, is realized at the BESM-6 computer, and is automatically connected with the library of microscopic constants, that includes 46 chemical elements. In the program a method is used, based on the analytical solution of the diffusion type equation with the known right part. The results of test calculations are presented. (Atomindex citation 10:431116)

IAE-2793 MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Homogenization of the Effective Cross Sections in a Periodic Lattice.
V. D. Sidorenko. 1977, 35p
In Russian.
U.S. Sales Only. Microfiche copies only.

A method of obtaining homogenized neutron cross sections for periodic reactor lattices in the P-1 approximation is described. Some general properties of the neutron distribution in an infinite lattice which do not depend on its specific structure are obtained using conditions of lattice periodicity and symmetry. E xpressions for the neutron distribution in a finite medium much larger than a separate cell are formulated. In this case the homogenized cross sections have proved to depend only on the neutron distribution in an equivalent cell. For the thermal energy range a description is given of the method developed to account for the simultaneously heterogeneous and thermalization effects on the homogenized diffusion coefficient. (Atomindex citation 10:433522)

IAE-2795 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
NEKTAR Code for Calculating Physical Characteristics of Graphite Reactors with the Account of Neutron Thermalization and Fuel Burnup.
A. O. Gol'tsev, and V. A. Karpov. 1977, 21p
In Russian.
U.S. Sales Only.

An algorithm for calculating the HTGR type reactor fuel cells is described. Under the assumption of fuel quasihomogeneity the two-group diffusion macro cross-sections are determined to be used in two- or three-dimensional calculations. A technique is outlined to anaiyze spatial and energy distributions of thermal neutrons with the account of neutron thermalization, fuel burnup and burnable poisons. Among those parameters determined are Ksub(infinity), THETA (thermal neutron absorption probability), nu (a number of secondary neutrons per neutron absorbed), mu (fast neutron multiplication factor), phi (resonance escape probability), Isub(ef) (exp 238 U or exp 232 Th effective resonance integral) and diffusion constants. The algorithm is realized in the NEKTAR code written in FORTRAN for a BESM-6 computer. Comparative evaluations fulfilled show the possibility to make use of the code to investigate the physics of the RBMK and Beloyarsk NPP (both LWGR type) reactors. (Atomindex citation 10:433505)

IAE-2807 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Neutron Diffusion in Heterogeneous Media ("Source-Sink" Method).
N. I. Laletin. 1977, 15p
In Russian.
U.S. Sales Only.

The neutron diffusion equations are derived from a kinetic equation written in the two-group approximation. The "source-sink" method is employed. The validity frames of the approximations are discussed as well as merits and demerits of the obtained equations set from the point of their numerical solution on computers. (Atomindex citation 10:433512)

IAE-2808 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Derivation of the "Source-Sink" Technique Equations from the Kinetic Equation.
N. I. Laletin. 1977, 15p
In Russian.
U.S. Sales Only.

The "source-sink" technique equations are derived from the the Boltzmann equation with a continuous energy dependence. The media is assumed to represent a uniform moderator where there are blocks (channels) with different fissioning, absorbing and moderating properties. The blocks are infinite cylinders with parallel axes. The set of equations is obtained in a two-group approximation with the account of neutron moderation,, resonance absorption and multiplication in a block. (Atomindex citation 10:433511)

IAE-2891 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Accuracy of the Quasialbedo Method.
V. A. Gomin, and S. S. Gorodkov. 1977, 11p
In Russian.
U.S. Sales Only.

The Galanin-Feinberg equations usually applied in the calculations of neutron fields in the heterogeneous reactors may be rewritten with a high accuracy in the form similar to the finite difference equations. This was achieved previously with the help of the so-called quasialbedo method. The finite-difference scheme developed was of 9 point type. The 25 point scheme is developed, which is much better approximated to the basic equations. Computer code, based on this new scheme, may be used for testing some doubtful result of previous programs. In the comparative calculations of a heterogeneous assembly the 9 point scheme achieved the 0.02% accuracy in Ksub(ef) and 0.05% - in fluxes. (Atomindex citation 10:433506)

IAE-2926 PC **A03**/MF **A01**
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii.
Group Constant Preparation for Nuclear Reactor Calculations on the BESM-6 Computer. ARAMAK-F Program Complex.
V. A. Lobyntsev, and I. G. Timofeev. 1977, 31p
In Russian.
U.S. Sales Only.

Described is the ARAMAK-F program complex - a FORTRAN version of the ARAMAKO program complex - which is used to calculate macroscopic and blocking microscopic neutron constants on the basis of the 26-group system of microscopic constants with an account of resonance cross section structure in subgroup presentation. All programs are written in the FORTRAN language for the BESM-6 computer. The program texts and check test problem are presented. (Atomindex citation 10:431128)

INIS-mf-4734 PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Analytical Methods of Solving a Set of Multigroup Diffusion Equations for Homogeneous Reactors. Review.
E. S. Glushkov, and N. A. Petushkova. 1977, 34p
In Russian.
U.S. Sales Only.

A review of the Soviet and foreign literature on analytical methods of solving a set of multigroup diffusion equations for homogeneous reactors is given over the period from 1950 to 1971. The methods of power series expansion and iteration-over-source are considered more thoroughly. A problem of thermal reactor profiling is of great importance, i.e., reactor control procedures, ensuring narrowing the gap between operation and maximum permissible conditions of fuel elements. The stability of variational methods, in particular, the Galerkin one, is analyzed. (Atomindex citation 10:433503)

JAERI-1255 PC **A10**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
JAERI Fast Reactor Group Constants Set, Version 2.
H. Takano, A. Hasegawa, M. Nakagawa, Y. Ishiguro, and S. Katsuragi. Mar 78, 206p
U.S. Sales Only.

The JAERI-Fast set version II(JFS-V-II) has been produced by revising the original JAERI-Fast set on a large scale. The revision works have been performed on the basis of the benchmark calculation for many fast critical assemblies, the cross section adjustment of using the least squares method and the evaluation of nuclear data. In JFS-V-II, the group constants of 25 nuclides, Be, exp 10 B, exp 11 B, C, O, Na, Al, Si, Cr, Mn, Fe, Ni, Cu, Mo, exp 232 Th, exp 233 U, exp 234 U, exp 235 U, exp 236 U, exp 238 U, exp 239 Pu, exp 240 Pu, exp 241 Pu, exp 242 Pu and exp 241 Am and FP group constants have been provided for both the standard seventy and twenty-five group structures. The composition dependence of group constants is taken into account for all these nuclides by preparing self-shielding factors. Especially, the self-shielding factors of important resonant nuclides are expressed by a function of three variables, i.e., composition, temperature and mutual interference parameter which is the ratio of the atomic number density of exp 238 U to that of the fissile resonant nuclei. Moreover, the infinitely dilute elastic removal cross sections and self-shielding factors of the elastic removal cross sections are newly tabulated for important light and medium nuclides, O, Na, Fe, Cr, Ni and Al. Applicability of JFS-V-II was assessed through the benchmark tests for many fast critical assemblies and the results were summarized. (Atomindex citation 10:433523)

PB80-181571 PC **A02**/MF **A01**
Commissariat a l'Energie Atomique, Paris (France).
CALIBAN: Distribution des Fluences Neutroniques et des Doses Gamma en Fonctionnement Continu (CALIBAN: Distribution of Neutron Flux and Gamma Doses in Continuous Operation),
J. Morin, J. Chevallier, R. Blanc, A. Mathieu, and C. Sester. Oct 74, 22p
Text in French.

In order to compensate for the temporary interruption of the PROSPERO reactor, it is desirable to use the CALIBAN reactor in continuous operation. As part of efforts to establish parameters for this service, a study was made of neutron flux and gamma dosage at distances of 50 to 70 cm from the axis of the CALIBAN core. This is a region that has hitherto been little studied during continuous operation. The results are given in this paper.

18M. Reactors (Non-Power)

NIIAR-P-26(320) PC **A02**/MF **A01**
Nauchno-Issledovatel'skij Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR).
Criteria for Efficiency Evaluation of Multiloop Reactor Utilization for Engineering Research.
V. A. Tsykanov, and V. A. Kuprienko. 1977, 20p
In Russian.
U.S. Sales Only.

Considered are the peculiar features of the loop reactors used for operation of the new types of the fuel assemblies within their entire service life. Suggested is the procedure for estimation of the economic efficiency of the loop reactors, which takes into account the peculiar features of the loop reactors, provides for practical analysis of the reactor operating conditions, and makes it possible to perform project estimation of the technical and economical characteristics of the designed system. The definitions for two criteria are suggested: productivity of the loop reactor and average cost of the performed experiments. Relationship between these criteria and operating parameters of the reactor is analyzed. Considered are various regimes of fuel recharging in the core, it is shown that optimum fuel burning takes place in the fuel assemblies under partial recharging conditions. The problem on the expedient number of the loop channels in the reactor core is discussed. (Atomindex citation 10:433794)

19. ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A083 770/8 PC **A03**/MF **A01**
Rockwell International Canoga Park CA Rocketdyne Div
Energetic Azido Compounds.
Annual rept. 1 Jan-31 Dec 79,
M. B. Frankel, E. R. Wilson, D. O. Woolery, C. Hamermesh, and C. McArthur. 28 Mar 80, 39p
Rept no. RI/RD80-124
Contract N00014-79-C-0043

A program was started on the synthesis and characterization of energetic azido compounds as potential ingredients for advanced propellant and explosive systems. Initially, a series of mono-azidoalkanes and diazidoalkanes were prepared to compare the molecular structure of these compounds with their impact sensitivity. All of the mono-azidoalkanes were insensitive to impact. The di-azidoalkanes gave varying results, depending on the structure.

AD-A083 773/2 PC **A03**/MF **A01**
MB Associates San Ramon CA
XM746 Practice Fuze.
Progress rept. no. 3, 1 Dec 79-31 Jan 80.
31 Jan 80, 40p
Contract DAAK10-79-C-0040

This program is for the design and development of the XM746 Practice Fuze Spotting Charge. The primary objective of the testing was to determine which of the three spotting charge candidates, MOD 'E', ORI or MBA would reliably produce the best visible smoke cloud in a muddy target area. All spotting charges were loaded into XM747E2 fuzes and assembled to the four port 155mm, XM804 projectile. The SW522 (MOD 'E') and ORI composition was contained within the fuze. The MBA configuration was assembled. MOD E is a standard M739 Fuze with cap, cross bar holder assembly, M1 Delay Plunger, safe/army assembly and explosive booster removed, loaded with 47 grams ARRADCOM pyro mix SW522. ORI is the same fuze as MOD E except SW-522 smoke composition replaced with a red phosphorous composition. MBA is similar to MOD E except smoke charge consists of titanium tetrachloride (TiCl4) a cold smoke composition which is expelled from the fuze body by an ARRADCOM MOD E smoke ejection charge.

AD-A084 029/8 PC **A06**/MF **A01**
SRI International Menlo Park CA
Development and Application of a Computational Shear Band Model.
Final rept. 7 Apr 76-7 Apr 77,
D. C. Erlich, L. Seaman, D. A. Shockey, and D. R. Curran. Mar 80, 123p ARBRL-CR-00416, AD-E430 412
Contract DAAD05-76-C-0762

A computational shear band model has been developed and used to predict the fragmentation response of explosively-loaded cylinders and munitions. The model is based on the physical processes occurring in the material that lead to fragmentation, as observed in experiments in which the fragmentation process was stopped at various stages of development. Good agreement was obtained between measured and computed fragment size distributions for two widely different steels, which suggests that the model can be used to predict the effects of variation of geometry, strain rate, and internal pressure on the fragmentation yield of munitions. In addition, fragments of long-rod penetrators of steel and a tungsten-7Ni-3Fe alloy were examined metallographically to establish the failure modes. The observations suggest that shear banding is a principal mode of penetrator failure. Computational simulations of a plate impacting on edge another plate at various oblique angles were performed using the two-dimensional wave propagation code TROTT with the BFRACT fracture model. The results showed the distribution of shear, compression, and bending stresses in the projectile and indicated the regions where tensile fracture of shear banding might occur.

N80-22526/1 PC **A02**/MF **A01**
Propellants, Explosives and Rocket Motor Establishment, Waltham Abbey (England).
A Chemiluminescence Study of Oxides of Nitrogen Evolved from Propellants.
I. G. Wallace, R. J. Powell, and B. J. Downes.
Sep 79, 21p PERME-TR-146, BR70270
Presented at 5TH Symp. On Chem. Probl. Related to the Stability of Explosives, Baastad, Sweden, May 1979.

A chemiluminescence NO sub x analyzer was used to study nitrogen oxides evolution from single base and double base propellants. The technique illustrates the importance of total oxides of nitrogen as a means for determining the rate at which these materials decompose. The potential of the method as a rapid and unambiguous means of assessing factors such as stability and compatibility is evaluated.

PAT-APPL-6-117 323 PC **A02**/MF **A01**
Department of the Navy Washington DC
Universal Firing Device.
Patent Application,
James C. Rudeen. Filed 31 Jan 79, 12p AD-D007 177/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

In an aircraft munition, an initiator and firing device is used to sequentially start a chemical reaction and deploy guidance fins. Rotation of an end piece compresses a spring until a release mechanism allows the stored up energy to force a firing pin into a primer cartridge. (Author)

PAT-APPL-6-117 702 PC **A02**/MF **A01**
Department of the Navy Washington DC
Two Stage Parachute Fuze Recovery System.
Patent Application,
John F. McNiela, and Carl R. Peterson. Filed 1 Feb 80, 15p AD-D007 176/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A two stage parachute recovery system for use in recovering fuzes or other sensitive equipment from a projectile that has been launched from a gun barrel wherein explosive means are successively detonated by a timing mechanisms and by centrifugal force imparted to the projectile respectively so as to deploy each of the said parachutes and to thereby recover the fuze before impact. (Author)

PAT-APPL-6-126 269 PC **A02**/MF **A01**
Department of the Navy Washington DC
The Recrystallization of Hexanitrostilbene from Nitric Acid and Water.
Patent Application,
Joseph C. Dacons. Filed 3 Mar 80, 5p AD-D007 173/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The production of 2,2',4,4',6,6'-hexanitrostilbene-I (HNS-I) having finely divided particles of uniform size by dissolving HNS-II in hot fuming nitric acid and then drowning the HNS-nitric acid solution in water. (Author)

PATENT-4 193 072 Not available NTIS
Department of the Navy Washington DC
Combination Infrared Radio Fuze.
Patent,
Wayne L. McKusich. Filed 13 Mar 62, patented 11 Mar 80, 4p AD-D007 200/9, PAT-APPL-177 617
Supersedes PAT-APPL-177 617-62.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to a warhead fuze and more particularly to a combination of infrared and an electromagnetic VT fuze. The electromagnetic VT or proximity fuze developed in past years is known to have operating deficiencies which make it less reliable than desired. For example, the radio doppler or proximity fuze is susceptible to countermeasures and has a reduced effectiveness when operating low over ocean waves. The electromagnetic VT fuze is also subject to enemy countermeasures, such as jamming for example, and natural causes of triggering such as snow, rain, water waves, terrain promontories and salvo effects. By combining an infrared channel with a radio channel in a proximity fuze, the dependability and utility of the proximity fuze is increased considerably. With the dual channel system, the fuze may be triggered only if both the infrared and the radio channels are activated simultaneously. With the combination fuze, the probability of a premature explosion on the way to the target is greatly reduced. The radio section may be triggered by enemy jamming or natural caused mentioned above, while the infrared channel may be triggered by heat from the sun, bright clouds or other hot targets giving off infrared radiation. The probability that both radio and infrared channels will be prematurely triggered at the same instant is extremely small, however. Additionally, the combination fuze will serve as a counter countermeasure in the event that the radio channel is successfully jammed.

UCID-18547 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Shock Initiation of Bare- and Covered-PBX-9404 Charges by Projectile Impact. Final Report.
H. C. Vantine. Jan 80, 47p
Contract W-7405-EBG-48

The shock initiation threshold of bare- and cased PBX-9404 explosives is being determined. The shocks are produced by the impact of steel projectiles in the velocity range of 0.5 to 5.0 km/s. Impacts in the 0.5 to 2.0 km/s range are being studied with a combination of experimental and calculational techniques. Impacts in the 2.0 to 5.0 km/s range will initially be studied only with calculational techniques. This first phase of the program addresses only normal impact. (ERA citation 05:017984)

UCID-18548 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Statistical Treatment of Heterogeneous Chemical Reaction in Shock-Initiated Explosives.
S. G. Cochran. 20 Feb 80, 23p
Contract W-7405-ENG-48

A statistical treatment is introduced for heterogeneities that influence the shock initiation of explosives. A shock forms locally heated regions or hot spots at heterogeneities that can become local reaction sites. Size distributions for hot spots and for local reactions sites are defined along with equations that evolve the distributions in time. Locally heated regions may either disappear (because of

thermal diffusion) or thermally explode. The rate of explosion of hot spots is based on a distribution of hot spot temperatures. Reaction sites grow at the laminar burning velocity which is pressure dependent. Reaction is completed by coalescence of the sites. The model of heterogeneous reaction along with a homogeneous reaction is solved numerically in a one-dimensional hydrodynamic computer program. The model and some results are presented. (ERA citation 05:016420)

19D. Explosions, Ballistics, and Armor

AD-A083 783/1 PC **A03**/MF **A01**
Illinois Univ At Urbana-Champaign Dept of Aeronautical and Astronautical Engineering
The Blast Wave from Deflagrative Explosions, an Acoustic Approach.
Interim rept. 1 Jun 78-31 May 79,
Roger A. Strehlow. Dec 79, 29p AAE-79-8, UILU-ENG-79-0508, AFOSR-TR-80-0308
Grant AFOSR-77-3336

Simple acoustic source theory has been applied to determine the maximum overpressure obtainable by the deflagration of nonspherical clouds. In three dimensions overpressure is generated not by the rate of energy addition but by the first time derivative of the rate. Because of this, deflagrative combustion of edge-ignited clouds produces markedly less overpressure than central, spherical ignition. Examples are presented for three nonspherical cloud and igniter geometries. The implication is that even high velocity, subsonic combustion waves cannot produce damaging blast waves and that some type of supersonic combustion or massive flame acceleration is required if a damaging blast wave is to be produced. (Author)

19F. Guns

AD-A083 870/6 PC **A02**/MF **A01**
Army Armament Research and Development Command Watervliet NY Large Caliber Weapon Systems Lab
Implementation of a Trapezoidal Ring Element in NASTRAN for Elastic-Plastic Analysis.
Technical rept.,
P. Chen, and P. O'Hara. Dec 79, 23p ARLCB-TR-79034, AD-E440 063
Presented at NASTRAN Users' Colloquium (8th), Goddard Space Flight Center, Oct 79, Greenbelt, MD.

The explicit expressions for an elastic-plastic trapezoidal ring element are presented and implemented in NASTRAN computer program. The material is assumed to obey the von Mises' yield criterion, isotropic hardening rule, and the Prandtl-Reuss flow relations. For the purpose of demonstration, two elastic-plastic problems are solved and compared with previous results. The first is a plane strain tube under uniform internal pressure and the second a finite-length tube loaded over part of its inner surface. A very good agreement has been found in both test problems.

AD-A083 872/2 PC **A02**/MF **A01**
Army Armament Research and Development Command Watervliet NY Large Caliber Weapon Systems Lab
Simulation of Partial Autofrettage Residual Stresses by Thermal Loads.
Technical rept.,
M. A. Hussain, S. L. Pu, J. D. Vasilakis, and P. O'Hara. Feb 80, 21p ARLCB-TR-80004, AD-E440 065

The effect of favorable residual stresses of an autofrettaged tube is well known. In many instances there is a redistribution of these stresses due to changes of geometrical configurations such as the presence of keyways, riflings, cracks, etc. The problem in general, can be studied by discretization carried out either by finite elements or by finite differences; however, it is usually not possible to incorporate the redistributed residual stress patterns due to the presence of such geometric changes. This difficulty is overcome by simulation of residual stresses by certain active loadings. The simulation by dislocation and equivalent thermal loading for a fully autofrettaged tube is well known. In this report we extend the thermal loading to simulate a partially autofrettaged case. The simplicity of the method is illustrated by comparing numerical results to those obtained from finite elements (NASTRAN) and finite differences.

AD-A083 873/0 PC **A02**/MF **A01**
Army Armament Research and Development Command Watervliet NY Large Caliber Weapon Systems Lab
Potential Erosion Resistant Refractory Metal (and/or) Alloy Coatings for Gun Tubes.
Technical rept.,
I. Ahmad, P. Greco, G. D'Andrea, and J. Barranco. Dec 79, 20p ARLCB-TR-79037, AD-E440 061
Pub. in Proceedings of the Tri-Service Conference on Corrosion (1978). New Orleans, LA, Oct 78, MCIC-79-40.

This report addresses the problem of erosion in gun tubes and the need to develop superior materials and techniques for its control in gun barrels.

AD-A083 888/8 PC **A02**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Prediction of Gun Muzzle Flash.
Technical rept.,
I. W. May, and S. I. Einstein. Mar 80, 23p ARBRL-TR-02229, AD-E430 413
Presented at the JANNAF Combustion Meeting, held at the US Air Force Academy, in August 1977.

This report presents some recent work on improving a simple, semiquantitative, muzzle flash predictive methodology developed by Carfagno, in his 'Handbook on Gun Flash'. The improved methodology was then applied to evaluating several possible solutions for reducing muzzle flash for a new 8-inch propelling charge. Later experimental results showed satisfying agreement with the earlier predictions.

AD-A084 027/2 PC **A03**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Muzzle Blast Overpressure Levels on the AH-1S Helicopter TOW Sight Unit.
Final rept.,
Edward M. Schmidt, and Edmund J. Gion. Mar 80, 32p ARBRL-MR-02997, AD-E430 410
Supersedes ARBRL-IMR-620.

An experimental program was conducted to measure the muzzle blast overpressures upon a simulated AH-1S Helicopter TOW Sight Unit (TSU). Different weapon configurations were fired to examine the effect of gun caliber and the presence of muzzle devices. Surface pressure distributions were measured along the line of symmetry of the TSU and were supplemented by spark shadowgraphs of the blast wave propagation. Limited data was acquired in the BRL Aerodynamics Range to measure the trajectory perturbation association with the internal gasdynamics of the muzzle devices.

19H. Underwater Ordnance

PATENT-4 185 552 Not available NTIS
Department of the Navy Washington DC
Mine Firing Control System.
Patent,
Whitman D. Mounce, and Ralph W. Mann. Filed 16 May 45, patented 29 Jan 80, 14p AD-D007 211/6, PAT-APPL-594 133
Supersedes PAT-APPL-594 133-45.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50 .

In a mine firing control system of the character disclosed, the combination of a mine firing control circuit including a plurality of electron discharge devices each of which is adapted to be rendered conducting when the bias voltage thereon is elevated to a predetermined value, circuit means including a first normally conducting electron discharge device for applying said bias voltage to said plurality of electron discharge devices, circuit means including a second normally non-conducting electron discharge device adapted to render said first electron discharge device non-conducting as said second electron discharge device is rendered conducting, means controlled by said mine firing control circuit for rendering said second electron discharge device conducting as the control circuit operates, and means for operating the control circuit. (Author)

PATENT-4 185 556 Not available NTIS
Department of the Navy Washington DC
Mine Firing System.
Patent,
Joseph F. Keithley, and Matthew L. Sands. Filed 6 Jun 45, patented 29 Jan 80, 13p AD-D007 196/9, PAT-APPL-597 930
Supersedes PAT-APPL-597 930-45.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

In a submarine mine, a normally open mine firing circuit, a timing device operable in unit cycles and having means for closing said firing circuit partially during a cycle of operations thereof, and pressure and magnetic responsive means each of which is adapted to either initiate a cycle of operations of said timing device or to complete said firing circuit during a cycle of operations of the timing device selectively in accordance with the sequence of response of said pressure and magnetic means are disclosed. (Author)

PATENT-4 185 881 Not available NTIS
Department of the Navy Washington DC
Underwater Cable Cutting Device,
Patent,
Bernard E. Drimmer, and Everett L. Moffett. Filed 6 Dec 51, patented 29 Jan 80, 10p AD-D007 205/8, PAT-APPL-260 292
Supersedes PAT-APPL-260 292-51.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissiner of Patents, Washington, DC 20231 $0.50.

This invention relates to a device for destroying a sweep wire or cable of the type generally employed for sweeping a mine field clear of mines. More specifically, the invention relates to an anti-sweep device of the submersible type adapted to be moored by a suitable length of cable in a predetermined position beneath the surface of a body of water within the path of travel of a sweep wire in which a special shaped explosive charge contained within the device is exploded in response to the engagement of the device by a sweep wire, the shaped charge being sufficiently large and formed in such a manner as to provide a shaped jet about the sweep wire when detonated whereupon the cable is severed in response thereto.

PATENT-4 187 779 Not available NTIS
Department of the Navy Washington DC
Marine Mine.
Patent,
Harry S. Jones, David B. Kirkpatrick, and Robert G. Wilson. Filed 19 Apr 45, patented 12 Feb 80, 22p AD-D007 198/5, PAT-APPL-589 228
Supersedes PAT-APPL-589 228-45.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

In a pressure responsive mine having a casing and an arming and firing circuit therein, a pressure responsive device is mounted in the casing and exposed to the pressure of the sea water, a second pressure responsive device mounted in the casing, a fluid connection between the first and second pressure responsive devices, a third pressure responsive device mounted in the casing, a restricted fluid pressure responsive connection between the second and third pressure responsive devices, and a circuit making and breaking device positioned in the restricted connection between the second and third pressure responsive devices and connected in the arming and firing circuit. (Author)

PATENT-4 189 999 Not available NTIS
Department of the Navy Washington DC

Vector Acoustic Mine Mechanism.
Patent,
Lloyd D. Anderson. Filed 5 Mar 56, patented 26 Feb 80, 11p AD-D007 199/3, PAT-APPL-569 662 Supersedes PAT-APPL-569 662-56.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a submarine mine actuating system responsive to the acoustic pressure signature of a target vessel moving through the water in the vicinity of the system comprising; an array of hydrophones including a first velocity hydrophone having a cosine response pattern and generating an electric signal in response to received underwater acoustic signals originating from said target vessel, and second velocity hydrophone having a response pattern similar to that of said first hydrophone and disposed in orthogonal relation therewith whereby the axes of maximum sensitivity of said hydrophones are mutually perpendicular so that the signals produced by said hydrophones undergo a phase reversal as the target vessel crosses an axis of maximum sensitivity of one of said hydrophones; a pair of transformers each having a primary coil coupled to the output of a respective one of said hydrophones to receive an output signal therefrom, a ring demodulator circuit having a first and a second pair of input terminals each connected across the respective secondaries of said transformers, a center-tap at each secondary winding of said demodulator circuit correlative to the phase relationship of the signals applied across the input terminals of said circuit to thereby indicate a phase reversal of the received acoustic signal as the target vessel crosses the axis of one of said hydrophones of said array. (Author)

20. PHYSICS

20A. Acoustics

AD-A083 844/1 PC **A03**/MF **A01**
Naval Surface Weapons Center Silver Spring MD
Surface Waves and Anomalous Sound Absorption.
Final rept.,
Ronald L. Kligman. 1 Jan 80, 50p Rept no. NSWC-TR-79-481

A theoretical model of surface waves in equilibrium with acoustic waves at a fluid-fluid interface is developed. Modifications to the usual pressure and particle velocity boundary conditions lead to a dispersion relation for the waves of the coupled system. An expression for the total reflection coefficient is found. The ratio of acoustic energy absorbed due to reflection from the interface to the incident wave energy is calculated making use of the previously obtained reflection coefficient. (Author)

AD-A083 895/3 PC **A10**/MF **A01**
Yale Univ New Haven CT Systems and Information Sciences
Frequency Spreading in Underwater Acoustic Signal Transmission.
Final rept. Feb 77-Jun 78,
Henti Tung, Franz B. Tuteur, and John G. Zornig. 15 Apr 80, 211p Rept no. S/IS-8001
Contract N00014-77-C-0237

The scattering of acoustic waves from a randomly varying wind-driven water surface is known to introduce both time and frequency spreading of the received signal. The frequency spreading is thought to be related to surface statistics and water wave motion. Therefore, knowledge of this relation leads to the possibility of predicting surface statistics by analysis of the received acoustic signal. One important feature of the frequency spreading function is that the Doppler sidebands are not equal in magnitude on both sides of the carrier. Unequal sidebands are predicted if the acoustic source and receiver are not located at the same depths below the water surface and if the direction of the surface wave motion is not perpendicular to the vertical plane containing both the source and the receiver. Experimental results from a model tank operated under various wind conditions have verified the existence of unequal Doppler sidebands under these conditions. However, strong asymmetries in sidebands were also observed under conditions under which the previous theory would have predicted no asymmetries at all. For example, strong asymmetries have been observed in the crosswind direction. This research is to explain the asymmetries not predicted in previous theory but discovered under laboratory operations, and to predict other asymmetries not yet found in either the experimental or the theoretical phase.

AD-A083 900/1 PC **A03**/MF **A01**
Defence Research Establishment Ottawa (Ontario)
Signal Analysis Using the Acousto-Optic Spectrum Analyzer.
Technical note,
Jim P. Lee. Nov 79, 36p Rept no. DREO-TN-80-2
Abstract in French.

This paper examines the instantaneous, Fourier power spectrum for different types of input signals such as CW, pulse modulated CW and linear FM signals using the acousto-optic spectrum anlayzer. The effect on the time-integrated output intensity distribution due to the truncation of the propagating acoustic signal by the finite aperture width of the Bragg cell is also analyzed. Some experimental results on pulse-modulated CW and linear FM signals are presented, and then compared with theory. (Author)

AD-A084 025/6 PC **A03**/MF **A01**
Naval Postgraduate School Monterey CA
An Investigation of Magneto-Acoustic Effects in Conductive Fluids.
Master's thesis,
Robert Franz Klaus. Dec 79, 47p

An acoustic wave propagating in a conductive medium in the presence of a magnetic field will induce electric potential fields and currents, and, associated with the electric currents, secondary magnetic fields. This interaction is of interest because it occurs in acoustic propagation through sea water in the presence of the earth's magnetic field, and at ultra-low frequency (ULF), acoustic waves should be detectable. A Green's function solution in an infinite medium is developed, with an infinite magnetic field and an infinite plane acoustic wave, from which it can be seen that the magneto-acoustic coupling strength varies linearly with the strength of the acoustic wave and with the magnetic field, and is inversely proportional to frequency. An experiment is described and analyzed in which this interaction is verified for a specific laboratory geometry to within an order of magnitude. Possible sources of the discrepancy in the magnitude of the effect are discussed, and some potential refinements for future experimentation are also noted. (Author)

IPPJ-310 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Ultrasonic Velocity Measurements in Expanded Liquid Mercury.
K. Suzuki, M. Inutake, and S. Fujiwaka. Oct 77, 20p
U.S. Sales Only.

The first results are presented of the sound velocity measurements in expanded liquid mercury. The measurements were made at temperatures up to 1600 exp 0 C and pressures up to 1700 kg/cm exp 2 by means of an ultrasonic pulse transmission/echo technique which was newly developed for such high temperature/pressure condition. When the density is larger than 9 g/cm exp 3 , the observed sound velocity decreases linearly with decreasing density. At densities smaller than 9 g/cm exp 3 , the linear dependence on the density is no longer observed. The observed sound velocity approaches a minimum near the liquid-gas critical point (rho sub(cr) asymptotically equals 5.5 g/cm exp 3). The existing theories for sound velocity in liquid metals fail to explain the observed results. (Atomindex citation 09:405709)

N80-23101/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Higher Order Mode Propagation in Nonuniform Circular Ducts.
Y. C. Cho, and K. U. Ingard. 1980, 11p NASA-TM-81481, E-418
Prepared in Cooperation with MIT, Cambridge. Presented at the 6TH Aeroacoustics Conf., Hartford, 4-6 Jun. 1980; Sponsored by Aiaa.

Higher order mode propagation in a nonuniform circular duct without mean flow was investigated. An approximate wave equation is de ved on the assumptions that the duct cross section varies slowly and that mode conversion is negligible. Exact closed form solutions are obtained for a particular class of converging-diverging circular duct which referred to as 'circular cosh duct.' Numerical results are presented in terms of the transmission loss for the various duct shapes and frequencies. The results are applicable to multimodal propagation, single mode propagation, and sound radiation from certain types of contoured inlet ducts, or of sound propagation in a converging-diverging duct of somewhat different shape from a cosh duct.

N80-23105/3 PC **A06**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen (Germany, F.R.). Inst. fuer Experimentelle Stroemungsmechanik.
Shear Layer Effects on the Performance of an Acoustic Mirror Microphone System.
F. R. Grosche, and G. Chiocchia. Mar 79, 102p DFVLR-FB-79-30

The waves travelling from a sound source within the open test section of a wind tunnel to an acoustic mirror-microphone system outside the test section were refracted and scattered by the free shear layer surrounding the wind tunnel flow. The effects of refraction on the performance of the mirror system were determined by calculating numerically the diffraction images of a point source of sound with and without flow. The computed data were then compared to the results of a corresponding set of experiments in a low speed windtunnel.

PATENT-4 193 130 Not available NTIS
Department of the Navy Washington DC
Fiber Optic Hydrophone for Use as an Underwater Electroacoustic Standard.
Patent,
A. Mark Young, Theodore A. Henriquez, and Allan C. Tims. Filed 7 Sep 78, patented 11 Mar 80, 8p AD-D007 193/6, PAT-APPL-940 550 Supersedes PAT-APPL-940 550-78, AD-D005 384.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A fiber optic hydrophone for use as an underwater electroacoustic standard. The hydrophone includes a fiber optic acoustic wave detector in one end of the hydrophone which is subjected to incident acoustical waves. A similar fiber optic is in an acoustically isolated compartment where the optic fiber is not affected by the incident acoustical wave. Comparison of light passing through each coil will determine incidence of an acoustical wave on the detector fiber. (Author)

20B. Crystallography

AD-A083 990/2 PC **A03**/MF **A01**
Air Force Materials Lab Wright-Patterson AFB OH
Computerized Drawing of Stereographic Projections.
Technical rept. Jun 74-Sep 77,
Robert E. Schafrik. Jan 80, 29p Rept no. AFML-TR-79-4137

The preparation of stereographic projections can be time consuming and tedious, especially for noncubic crystal systems. This study was an attempt to adapt an existing computer program to a CDC 6600/Cyber 76 mainframe computer with Calcomp plotting subroutines. Some modifications to the program plotting capabilities also were made. (Author)

N80-22450/4 PC **A04**/MF **A01**
European Space Agency, Paris (France).
Influence of Gravity on Chemical Vapor Deposition Processes.
G. Wahl, J. J. Nickl, and W. Just. Jan 80, 70p ESA-TT-544, BMFT-FB-W-77-41
Transl. Into English of "Einfluesse der Schwerkraft bei der Beschichtung Nach Dem CVD-Verfahren",

Rept. Bmft-FB-W-77-41 Dfvlr, Cologne and Brown, Boveri und Cie, a.G. Heidelberg.

The effect of gravity on the chemical vapor deposition process is described as twofold: it affects the convection in the stationary case, and it creates instabilities. The hydrodynamic theory of chemical vapor deposition process is described. Theoretical results are compared with deposition experiments (SiO2, Si3N4 deposition) and with fume experiments. In order to investigate experimentally the influence of gravity on the crystal structure, Si epitaxy experiments are proposed. The experimental arrangement necessary for these experiments is described and tested for TiN deposition experiments.

20C. Electricity and Magnetism

PB80-178080 Not available NTIS
National Bureau of Standards, Washington, DC.
Electric Dyadic Green's Functions in the Source Region.
Final rept.,
A. D. Yaghjian. Feb 80, 16p
Pub. in Proc. IEEE, v68 n2 p248-263 Feb 80.

A straightforward approach that does not involve delta-function techniques is used to rigorously derive a generalized electric dyadic Green's function which defines uniquely the electric field inside as well as outside the source region. The electric dyadic Green's function, unlike the magnetic Green's function and the impulse functions of linear circuit theory, requires the specification of two dyadics: the conventional dyadic G sub (e) outside its singularity and a source dyadic L which is determined solely from the geometry of the 'principal volume' chosen to exclude the singularity of G sub (e). The source dyadic L is characterized mathematically, interpreted physically as a generalized depolarizing dyadic, and evaluated for a number of principal volumes (self-cells) which are commonly used in numerical integration or solution schemes. Discrepancies at the source point among electric dyadic Green's functions derived by a number of authors are shown to be explainable and reconcilable merely through the proper choice of the principle volume. Moreover, the ordinary delta-function method, which by itself is shown to be inadequate to extract uniquely the proper electric dyadic Green's function in the source region, can e supplemented by a simple procedure to yield unambiguously the correct Green's function representation and associated fields.

20D. Fluid Mechanics

AD-A083 664/3 PC **A04**/MF **A01**
Tennesse Univ Knoxville Dept of Engineering Science and Mechanics
Research on Numerical Algorithms for the Three Dimensional Navier-Stokes Equations. I. Accuracy, Convergence & Efficiency.
Interim technical rept. 1 Oct 78-30 Sep 79,
A. J. Baker. Sep 79, 61p AFFDL-TR-79-3141
Grant AFOSR-79-0005

The objective of this research is to develop a highly accurate and efficient numerical solution algorithm for the non-linear three- dimensional Navier-Stokes equations for aerodynamics applications. A candidate algorithm has been derived employing finite element interpolation theory, the non-linear extension of quasi-variational principles, and the concept of tensor product bases. The resultant solution statement is rendered soluable using an implicit integration algorithm, and the replacement of the standard Jacobian of a Newton iteration algorithm with a tensor matrix product form. A linearized stability analysis indicates the basic algorithm is spatially fourth-order accurate in its most elementary embodiment. The control of an added dissipation mechanism can elevate this to sixth order, but numerical experimentation indicates the resultant artificial diffusion is unacceptably large. By the same measure, this additional accuracy is intrinsic to the quadratic element embodiment of the algorithm with freedom from artificial diffusion. The results of several numerical experiments for single- and multi-dimensional convection-dominated test problems confirms the basic viability of this algorithm and its tensor produce formulation. The latter is of paramount importance in rendering the algorithm nominally as efficient as familiar lower-order accurate finite difference formulations. (Author)

AD-A083 767/4 PC **A03**/MF **A01**
Purdue Univ Lafayette IN Project Squid Headquarters
Flow Field Measurement Using Raman and LDV Techniques.
Interim rept.,
S. Lederman, A. Celentano, and J. Glaser. Apr 79, 37p Rept no. SQUID-PIB-36-PU
Contract N00014-75-C-1143
Prepared in cooperation with Polytechnic Inst. of New York, Farmingdale. Aerodynamics Labs.

The application of spontaneous Raman, Coherent Antistokes Raman Scattering (CARS) and Laser Doppler Velocimeters (LDV) techniques to a wide spectrum of flow fields confirms the basis hypothesis, that these laser based diagnostic techniques have a very wide range of applicability and can be instrumental in providing experimental data in friendly as well as hostile environments unobtainable by conventional means. The data can be obtained non-intrusively and remotely. (Author)

AD-A083 823/5 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
The Stokes and Krasovskii Conjectures for the Wave of Greatest Height.
Technical summary rept.,
J. B. McLeod. Feb 80, 31p Rept no. MRC-TSR-2041
Contract DAAG29-75-C-0024

It is shown that there exists a solution to Nekrasov's integral equation which describes a wave of greatest height and of permanent form moving on the surface of a non-viscous, irrotational, infinitely deep flow. It is also shown that this wave can be obtained as the limit, in a specified sense, of waves of almost extreme form. Stokes conjectured, almost 100 years ago, that in the extreme case the wave is sharply crested and the wave surface makes an angle of pi/6 with the horizontal at the crest, and Krasovskii conjectured that, for waves of non-extreme form, which are smooth-crested, the angle between the surface and the horizontal at no point exceeds pi/6, the latter belief being widely held until some recent numerical calculations cast some doubt upon it. While the present paper makes only partial progress towards deciding Stokes' conjecture, it does confirm the numerical evidence and prove that the Krasovskii conjecture is false for waves sufficiently close to the extreme form, the angle exceeding pi/6 in a boundary layer.

AD-A083 970/4 MF **A01**
Army Missile Command Redstone Arsenal AL Systems Simulation and Development Directorate
Calculation of the Laminar Viscosity of a Gaseous Mixture for Gas Dynamic Mixing Comparisons for a Reacting Shear Layer.
Technical rept.,
B. J. Walker. Oct 79, 55p Rept no. DRSMI/RD-80-2
Availability: Microfiche copies only.

This investigation determined the laminar viscosities of NO2 and O3 at elevated temperatures. The technique to accomplish this is relevant to other gases and a generalized method for calculation of viscosities of other gases is presented. The results are compared to the calculational method of Svehla (2) for CO2 at elevated temperatures. A cubic spline interpolation routine using a Lagrangian polynomial treatment of the end points is formulated and coded. (Author)

CONF-800502-3 MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Application of Reconstructive Tomography to the Measurement of Density Distribution in Two-Phase Flow.
J. R. Fincke, M. J. Berggren, and S. A. Johnson. 1980, 20p
Contract EY-76-C-07-1570
26. international instrumentation symposium, Seattle, WA, USA, 5 May 1980.
Microfiche copies only.

The technique of reconstructive tomography has been applied to the measurement of average density and density distribution in multiphase flows. The technique of reconstructive tomography provides a model independent method of obtaining flow field density information. The unique features of interest in application of a practical tomographic densitometer system are the limited number of data values and the correspondingly coarse reconstruction grid (0.5 by 0.5 cm). These features were studied both experimentally, through the use of prototype hardware on a 3-in. pipe, and analytically, through computer generation of simulated data. Prototypical data were taken on phantoms constructed of Plexiglas and laminated Plexiglas, wood, and polyurethane foam. Reconstructions obtained from prototype data were compared with reconstructions from the simulated data. (ERA citation 05:016323)

FRNC-TH-818 PC **A06**/MF **A01**
Toulouse-3 Univ. (France).
Model Applied to an Argon Plasma. Application for Stationary Electric Arc.
1978, 112p
In French.Thesis.
U.S. Sales Only.

A model based on a coupled system of continuity equations for actual level densities of the argon atom and the electron energy equation has been established to describe the evolution of an argon plasma in a wall-stabilized arc with cylindrical symmetry. This model has been applied to stationary homogeneous and unhomogeneous plasma to determine local properties (densities and temperatures) from the knowledge of the electron density and the electric field. (Atomindex citation 10:488787)

KFK-2623 PC **A03**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung.
Comparison Between a One- and a Two-Dimensional Calculation of a Water-Vapor Nozzle Flow.
F. Kedziur, and H. Moesinger. Oct 78, 39p
In German.
U.S. Sales Only.

The steady water-vapor flow through a convergent nozzle is simulated with the two-phase computer codes DRIX-2D (two-dimensional, transient) and DUESE (one-dimensional, stationary). The results of both codes are compared and interpreted under consideration of their different modeling, especially with respect to the dimensionality and the time-behaviour. In a similar way the one- and two-dimensional calculations of the code STRUYA are compared, which is applied to an ideal gas flow through the HENRY-nozzle. In addition an illustrative, analytical model is developed, which under certain assumptions, determines the difference in the pressure drop between one- and two-dimensional calculation of a nozzle-flow. The main result of these comparisons is the understanding, that in principle the two-dimensional calculation renders a larger pressure-drop of the nozzle-flow than the one-dimensional one. (orig.) 891 GL. (Atomindex citation 10:433398)

NUREG/CR-1422 PC **A03**/MF **A01**
Argonne National Lab., IL. Components Technology Div.
Analytic Rebalance Technique for Pressure Calculation in Two-Phase Flow Systems.
Technical memo,
C. C. Miao, V. L. Shah, J. L. Krazinski, and W. T. Sha. May 80, 37p ANL/CT-80/19

The present report describes the Analytic Rebalance Technique for the solution of two-phase fluid flow problems. The procedure is based on direct solution of only a section of the flow field at a time, along with rebalancing of the remaining flow field. The derivation of the equations and the step by step solution procedure are presented for developing a computer program for analyzing two-phase flows.

N80-22652/5 PC **A04**/MF **A01**
Aeronautical Research Inst. of Sweden, Stockholm. Fluid Technology Lab.
Flexnozzle Steering of Analog Flow Diverters.
K. S. Nystroem, and R. F. Boucher. 1979, 53p
FFA-MEMO-118

The concept of using a sharp-edged nozzle whose two edges are not parallel (nor necessarily straight) is shown to be effective in changing the Flexistor valve behavior from digital to analog. In the Flexistor valve the flow diversion between two outlets is achieved by small movement of one side of a two dimensional sharp-edged nozzle. Test measurements of flow division between the two outlets as a function of rotation of one side of the nozzle are presented for several geometries. Useful geometries giving a good analog function are noted. A feedback model developed as an aid to understanding the device behavior and as a design tool is described. This simple and continuous flow division is applicable to flows of liquids, slurries, or gases. A particularly useful area of application is that of by-pass where a controlled proportion of a fluid stream is diverted around a device. The device may, for example, be a heat exchanger. Because of the simplicity of Flexnozzle actuation a simple downstream temperature sensor/actuator is all that is required to close the loop for temperature regulation. Many similar bypass situtations exist in process engineering.

N80-22653/3 PC **A04**/MF **A01**
European Space Agency, Paris (France).
The Determination of the Laval Nozzle Exit Conditions at a Too High Counter-Pressure Especially for a Propane Oxygen Gas Generator.
E. Riester. Nov 78, 65p ESA-TT-504-REV, DLR-FB-77-45
Transl. into English of "Ermittlung des Austrittszustandes Aus Lavalduesen bei Zu Homen Gegendruck, Speziell bei Einem Propan-Sauerstoff-Gasgenerator", Rept. Dlr-FB-77-45 Dfvlr, Brunswick (Germany, F.R.). Sep. 1977. Original Report in German Previously Announced as X79-71927.

The flow conditions in a supersonic nozzle including normal shock were investigated. A more dimensional calculation method for an ideal gas is presented to compute the nozzle exit parameters and the location of the shock. The boundaries of the pressure behind the nozzle were calculated. For gas from the combustion of propane and oxygen, it is shown that the consequences of real gas effects on the results of the method are small. Experimental measurements on nozzles with air flow show the validity of the method. At a propane oxygen gas generator, the exhaust temperature is very high; therefore, measurements are possible only in the jet behind the nozzle exit. The pilot pressure and the temperature measurements show that the chemical reaction in the combustion chamber was incomplete.

N80-22655/8 PC **A13**/MF **A01**
Delft Hydraulics Lab. (Netherlands).
Bubble Cavitation in Relation to Liquid Quality.
D. M. Oldenziel. May 79, 296p PUBL-211
Submitted for Publication.

Techniques to measure the cavitation strength in a flow are described. The techniques are based on the dynamics of a bubble in a liquid and on the theory of gas diffusion in liquids. The measuring instruments used in cavitation research are reviewed. Theoretical considerations of bubble dynamics in liquids are summarized and a mathematical model is presented which shows the effects of the quality of the liquid on the cavitation strength.

N80-22656/6 PC **A03**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Scientific Services Div.
Finite Difference Calculation of Incompressible Flow Through a Straight Channel of Varying Rectangular Cross Section, with Application to Low Speed Wind Tunnels.
J. Vandervooren, and A. Sanderse. 26 Jun 79, 30p NLR-TR-77109-U

A fully-conservative finite difference algorithm is described to calculate the incompressible flow through a straight channel of varying rectangular cross section. Both the width and the height of the channel may vary independently. The algorithm was used successfully in the design of the German-Dutch low speed wind tunnel.

N80-22657/4 PC **A04**/MF **A01**
Bristol Univ. (England). Dept. of Aeronautical Engineering.
The Impingement of Underexpanded, Axisymmetric Jets on Normal and Inclined Flat Plates. Volume 1: Text.
P. J. Lamont, and B. L. Hunt. Dec 77, 75p
Contract AT/2034/040GW

The results of an extensive experimental study of the impingement of supersonic air jets upon a flat plate are presented. The supersonic jets were produced by a convergent-divergent nozzle with a conical exit section operated at two under-expansion ratios. The pressure distribution on the flat plate was recorded when the plate was set at distances between 0.5 and 15 exit diameters below the nozzle and inclined at angles to the jet axis in the range from 90 deg to 30 deg. Shadowgraph pictures of the impinging flow field were taken for most cases. The pressure distribution results are of sufficient resolution to accurately define the plate pressure distributions in most cases. Analysis shows that a momentum method can predict the overall load normal to the flat plate at any inclination. Correlations between important parameters of the pressure distributions for normal impingement and certain free-jet characteristics were found, which may enable these parameters to be predicted in other free-jet conditions.

N80-22658/2 PC **A11**/MF **A01**
Bristol Univ. (England). Dept. of Aeronautical Engineering.
The Impingement of Underexpanded, Axisymmetric Jets on Normal and Inclined Flat Plates. Volume 2: Figures.
P. J. Lamont, and B. L. Hunt. Dec 77, 239p
Contract AT/2034/040GW
2.

Figures generated in an extensive experimental study of the impingement of supersonic air jets upon a flat plate are presented. These include the pressure distribution on the flat plate and shadowgrah pictures of the impinging flow field. The pressure distribution results are of sufficient resolution to accurately define the plate pressure distributions in most cases. Analysis shows that a momentum method can predict the overall load normal to the flat plate at any inclination. Correlations between important parameters of the pressure distributions for normal impingement and certain free-jet characteristics were found, which may enable these parameters to be predicted in other free-jet conditions.

PB80-181647 PC **A03**/MF **A01**
Maryland Univ., College Park. Dept. of Mechanical Engineering.
Two-Phase Flow Model Test Facility.
Interim rept. 15 Aug 75-31 Jan 77,
Dirse W. Sallet, Manfred Guehler, and Chung Y. Tsui. Apr 80, 26p FRA/ORD-76/298
Contract DOT-FR-64181

This report describes test facilities for the investigation of two-phase flows. The test facility completed to this date consists of the Blow-Down Test Apparatus and the Bubble and Slug Flow Tunnel. It is the purpose of the test facilities to support, test and aid in the development of safety valve sizing equations when different two-phase regimes occur.

20E. Masers and Lasers

AD-A083 648/6 PC **A13**/MF **A01**
Michigan State Univ East Lansing
Computer Modeling of Pulsed Chemical Lasers.
Final rept. 1 Nov 78-31 Oct 79,
R. L. Kerber. 1 Dec 79, 282p AFOSR-TR-80-0300
Grant AFOSR-75-2842

The goal of this research is to quantify laser pulse energy and intensity on P-branch and rotational lasing transitions and provide data from well-defined experiments for interpretation and analysis of computational studies of HF and DF chemical lasers. A compendium of technical reports and publications on rotational non-equilibrium effects in the HF and DF lasers is presented. Modeling efforts have assessed the sensitivity of laser performance to various kinetic mechanisms. The importance of rotational non-equilibrium is identified and the possible effect of vibrational to rotational energy transfer on P-branch and rotational lasing is considered.

AD-A083 930/8 PC **A02**/MF **A01**
Ministry of Defence, Aldermaston (England) Atomic Weapons Research Establishment.
A Multiple Pulse CO2 TEA Laser for Use in Thermal Blooming Studies.
T. D. J. Cameron, J. A. McMordie, and R. J. Prosser. Mar 80, 16p AWRE-O-6/80, DRIC-BR-73030

The design, performance and operating characteristics of a multiple pulse CO2 TEA laser constructed at AWRE for use in thermal blooming studies is described. Using unstable resonator optics, at the maximum pulse repetition frequency of approx. 10.4 Hz, this laser yielded a good quality output beam of mean power 28 + or - 2 W. (Author)

AD-A084 014/0 PC **A05**/MF **A01**
Avco Everett Research Lab Inc Everett MA
One Meter KrF Laser System.
Semi-annual technical rept. 25 May 78-23 Feb 79,
J. C. Hsia, J. H. Jacob, and C. Duzy. 23 Feb 79, 86p
Contract N00014-76-C-1032, DARPA Order-3125

This interim report covers research directed towards the development of efficient, high power, UV/visible lasers. The key issues being addressed are: (1) e-beam and e-beam controlled discharge excitation, (2) laser kinetics and modeling, (3) discharge stability and enhancement, (4) laser medium gain, adsorption and energy extraction, and (5) intrinsic laser efficiency and scaling. Using e-beam controlled discharge pumping of Hg/Cl2/Ar mixtures, a HgCl intrinsic laser efficiency of 3% was obtained at a specific energy of 1.4 J/liter. The laser performance was found to be adversely affected by high active medium absorption and poor branching into HgCl* from 3P0 and 3P1 states of Hg*. The efficiency of e-beam excited KrF lasers was shown to improve with heating of the laser mixture. This improvement was shown to be consistent with the theoretically calculated reduction in three body quenching of KrF* with increasing temperature. An XeF specific laser energy of 14 J/liter was achieved in 3 amagat mixture of NF3/Xe/Ne with 5% intrinsic efficiency. The rate constants for XeF ground state vibrational mixing and dissociation have been calculated theoretically. These calculations have been compared with experimental data. (Author)

N80-22679/8 PC **A02**/MF **A01**
Laser Development Corp., Lexington, MA.
Development of Tunable High Pressure CO2 Laser for Lidar Measurements of Pollutants and Wind Velocities.
Contractor Report, Oct. 1977 - Jan. 1979.
J. S. Levine, M. Guerra, and A. Javan. Apr 80, 24p NASA-CR-3274
Contract NAS1-14885

The problem of laser energy extraction at a tunable monochromatic frequency from an energetic high pressure CO2 pulsed laser plasma, for application to remote sensing of atmospheric pollutants by Differential Absorption Lidar (DIAL) and of wind velocities by Doppler Lidar, was investigated. The energy extraction principle analyzed is based on transient injection locking (TIL) at a tunable frequency. Several critical experiments for high gain power amplification by TIL are presented.

N80-22691/3 PC **A03**/MF **A01**
Physics Lab. RVO-TNO, The Hague (Netherlands).
Lidar: A Statistical Approach.
C. W. Lamberts. Aug 78, 47p PHL-1978-31, TDCK-71317

Preliminary results are described for lidar experiments performed to obtain the optical parameters of the atmosphere under a variety of weather conditions. Software was developed to process either single shot measurements or a number of measurements statistically. It is shown that from the statistical approach a number of relations can be deduced between parameters obtained by lidar techniques and a number of atmospheric quantities recorded simultaneously with the lidar measurements.

PATENT-4 196 401 Not available NTIS
Department of the Navy Washington DC
Method and Apparatus for Injecting Gas into a Laser Cavity.
Patent,
Joel M. Avidor, and Charles J. Knight. Filed 17 Apr 78, patented 1 Apr 80, 8p AD-D007 186/0, PAT-APPL-896 946
Supersedes PAT-APPL-896 946-78, AD-D005 063.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Laser gas injected into a multiple-pulsed electric discharge laser (EDL) must be removed as quickly as possible following each laser pulse. This 'clearing time' can limit the average laser output power. Fast, efficient mass transport is needed and it, in turn, requires the establishment of a uniform velocity flowfield. Such a uniform flowfield can be established by injecting the laser gas through arrays of porous tubes formed with eccentric walls tailored in wall thickness to introduce a non-uniform injection velocity around the circumference of each tube. Preferably, the tubes have a cross-sectional shape formed of displaced circular inner and outer contours to provide a progressively thickening wall. Tailoring is designed to establish an optimum, non-uniform injection velocity distribution capable of producing a nearly irrotational flow that rapidly develops into a uniform flowfield downstream of the tube array. Because of the enhanced heat transfer characteristics of the porous tubes, a beneficially uniform gas temperature also is maintained to assure good optical medium homogeneity. (Author)

PATENT-4 201 952 Not available NTIS
Department of the Navy Washington DC
Gas Laser Aerodynamic Window.
Patent,
Charles C. Stewart, Joel M. Avidor, Evan R. Pugh, and John W. Lothrop. Filed 11 Apr 78, patented 6 May 80, 8p AD-D007 209/0, PAT-APPL-895 416
Supersedes PAT-APPL-895 416-78, AD-D005 223.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The aerodynamic window is formed of a contiguous pair of gas jet streams driven at subsonic velocity across the entire cross-sectional area of an annular laser beam. One of the jet streams has a shear interface with the interior gas of the laser and has its index of refraction matched to it. The other interfaces with the outside air into which the beam passes and it too has a refraction index matched to the air. Matching of the indices minimizes optical distortion of the beam at the shear interfaces. Distortion produced at the boundary layer of the contiguous jet streams is minimized by equalizing their velocities. To maintain a desired laser cavity pressure, the jet streams are permitted to bend responsively to the pressure differential. The degree of the bending is controlled to reduce window gas consumption. (Author)

PB80-178114 Not available NTIS
National Bureau of Standards, Washington, DC.
Narrow-Band Pulsed Dye Laser System for Precision Nonlinear Spectroscopy.
Final rept.,
G. L. Eesley, M. D. Levenson, D. E. Nitz, and A. V. Smith. Feb 80, 3p
Pub. in IEEE Jnl. Quant. Electron., vGE-16 n2 p113-115 Feb 80.

A CW oscillator/pulsed amplifier dye laser system that produces 20 kW of diffraction limited radiation with a linewidth of 17 + or - 4 MHz is reported. The key component is a unique long pulse Nd:YAG pump laser.

PB80-182280 Not available NTIS
National Bureau of Standards, Washington, DC.
Survey of Refractive Data on Materials for High-Power Ultraviolet Laser Applications.
Final rept.,
A. Feldman, R. M. Waxler, and I. H. Malitson. 1979, 7p
Sponsored in part by Advanced Research Projects Agency, Arlington, VA.
Pub. in Proceedings Conference on Physical Properties of Optical Materials, Held at San Diego, CA on Aug 27-29, 1980, and Jnl. Soc. of Photo-optical Instrumentation Engineers, v204 p95-101, 1979.

A literature survey of refractive indices, thermo-optic constants, and photoelastic constants has been conducted for materials of potential use in high-power ultraviolet applications. The limiting ultraviolet wavelength for which data exist is given for twenty alkali-halides, sixteen other crystalline solids, and three glasses. The bulk of the materials selected for the survey have band gaps that exceed 7 eV which is twice the photon energy of the XeF laser. There are large gaps in the available data for most of the materials.

RL-79-036 MF **A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Annual Report to the Laser Facility Committee 1979.
Mar 79, 476p
U.S. Sales Only. Microfiche copies only.

The report covers the work done at the Central Laser Facility, Rutherford Laboratory during the year preceding 31 March 1979. Preliminary work already undertaken on the upgrade of the glass laser and target areas consisting of the relocation of the two beam target chamber and tests on phosphate glass and also the completion of the electron beam generator for use by researchers on high power gas laser systems, are described. Work of the groups using the glass laser facility are considered under the headings; glass laser development, gas laser development, laser plasma interactions, transport and particle emission, ablative compression studies, atomic and radiation physics, XUV lasers, theory and computation. (Atomindex citation 10:489331)

20F. Optics

AD-A083 659/3 PC **A03**/MF **A01**
Brown Univ Providence RI Div of Engineering
Remote Optical Control and Switching in Optical Fiber Links.
Final technical rept. 1 Oct 77-30 Sep 78,
R. V. Gauthier, and A. V. Nurmikko. Jan 80, 45p
RADC-TR-79-346
Contract F19628-78-C-0009

In this project work, means were considered to achieve high-speed (>GHz) switching and modulation in integrated optical circuits, suitable for fiber optics applications. In particular, design and performance criteria were calculated for a planar coupled optical channel device, electro-optically switched by synchronous electrical signals propagating along an asymmetric coplanar waveguide stripline. Design was also executed for several of the components in the laboratory although full integration was not completed within the project period. (Author)

AD-A083 742/7 PC **A02**/MF **A01**
Oregon Graduate Center Beaverton
Wave Propagation in Particulate Media.
Annual summary rept. 1 Sep 79-15 Apr 80,
Richard A. Elliott. 18 Apr 80, 11p
Contract N00014-79-C-0897

Progress in developing techniques for producing well characterized scattering media from dielectric liquid emulsions and the design of equipment to measure their optical properties and their effect on laser pulse propagation are outlined. (Author)

AD-A083 883/9 PC **A03**/MF **A01**
Fairleigh Dickinson Univ Teaneck NJ Dept of Physics
Determination of the Optical Constants of Highly Absorbing Materials in the Infrared Region.
Final rept. 1 May 78-30 Jun 79,
K. D. Moeller, and V. P. Tomaselli. Feb 80, 37p
FDU-2, ARCSL-CR-80024, AD-E410 244
Contract DAAK10-77-C-0121

The behavior of electromagnetic waves in ideal lossless dielectrics is used to generate expressions for the reflection coefficients. Strongly absorbing dielectrics are considered and methods for evaluating their optical constants are presented. The effect of polarized infrared radiation on measured reflected intensities is detailed. Anisotropic materials and their particular measurement problems are discussed. Application to powder spectroscopy of highly absorbing materials is made. A summary of experimental results is presented.

AD-A083 975/3 PC **A03**/MF **A01**
Science Applications Inc Ann Arbor MI Optical Sciences Div
Absorption of Submillimeter Radiation by Battlefield Gases. Part II.
Technical rept. Jan-Oct 79,
D. H. Leslie, and J. L. Manning. Jan 80, 34p SAI-79-006-AA-2, ERADCOM/ASL-CR-80-5343-1
Contract N00024-79-C-5343

The purpose of this report is to investigate properties of the atmosphere likely present in a land battlefield encounter, and to point out the impact of these properties which might affect the use of submillimeter wavelength electro-optic devices. The meaning of the term 'submillimeter' should imply wavelength shorter than 1 mm. However, historically the term has included spectroscopic region between coherent microwave sources, and thermal infrared sources. The frequency range contains an area of black magic materials: e.g. polyethylene windows, wire gratings, Rhestrahlen crystal filters, etc. For atmospheric sciences, the submillimeter is the region with wavelength beyond the 15 micron CO(2) vibration band. For spectroscopy, the region is studied with very large coarsely ruled diffraction gratings at the infrared side, and very high harmonics of crystal oscillators on the microwave side. The absorption by molecules in this region is almost completely due to transitions between rotational energy levels with no change in vibrational state.

CLM-R-189 PC **A02**/MF **A01**
UKAEA Culham Lab., Abingdon (England).
CUPID: A Ray-Tracing Program for Continuously Varying Refracting Media.
M. Hubbard, and A. Montes. Jul 78, 13p
U.S. Sales Only.

A semi-analytic ray-tracing routine is described that allows refraction through continuously varying refracting media to be studied. The program was developed to investigate scattering from laser produced plasmas, but could be adapted for many other situations. (Atomindex citation 10:489196)

N80-22571/7 PC **A02**/MF **A01**
European Space Agency, Paris (France).
Calculation of Heterodyne Detection with Focused Radiation.
F. Maiota. Jul 79, 20p ESA-TT-552, DFVLR-FB-78-20
Transl. into English of "Berechnungen Zum Heterodyne-Empfang MIT Fokussierter Strahlung", Rept. Dfvlr-FB-78-20 Dfvlr, Oberpfaffenhofen (Germany, F.R.). Original Report in German Previously Announced as X79-76600.

The principal problems associated with heterodyne detection when use is made of focused radiation are examined. Focusing the radiation represents one way of attenuating the demands made on the mechanical structure of an installation. Several possible arrangements of this type are explained and the signal-to-noise ratios associated with them are computed. The basis for this computation is constituted by the three-dimensional formulation of the focus region (Lommel-function). The manner in which the signal-to-noise ratio depends on the distance between the detector and the focal plane is investigated, and the results and the limitations of the computational methods are discussed.

N80-22692/1 PC **A02**/MF **A01**
Physics Lab. RVO-TNO, The Hague (Netherlands).
Transformation of the Wavelength of Lasers by Means of Stimulated Raman Scattering (SRS).
M. J. M. Vandeven. Nov 78, 20p PHL-1978-44, TDCK-71520
Contract A71/KL/119

It is shown that irradiation of the Raman active liquid CS2 with a short pulse 1.06 micrometers Nd-

Yag laser results in wavelength conversion to larger infrared wavelengths by means of stimulated Raman scattering (SRS). The longer IR wavelengths are less harmful to the observer's eye. Contrary to previous experiments no stimulated Brillouin scattering (SBS) was observed to compete with the SRS process. Irridiation with a 1.06 micrometer pulse train shows both SRS and SBS radiation, thereby greatly reducing the conversion efficiency.

N80-23139/2 PC **A02**/MF **A01**
North Carolina Agricultural and Technical State Univ., Greensboro. Dept. of Mechanical Engineering.
Study of Composites as Substrate Materials in Large Space Telescopes.
Final Report.
A. V. Sharma. 1979, 21p NASA-CR-163008
Grant NSG-8045

Nonmetallic composites such as the graphite/epoxy system were investigated as possible substrates for the primary mirror of the large space telescope. The possible use of fiber reinforced metal matrix composites was reviewed in the literature. Problems arising out of the use of composites as substrate materials such as grinding, polishing, adherence of reflective coatings, rigidity of substrate, hygrospcopici tendency of the composites, thermal and temporal stability and other related problems were examined.

N80-23148/3 PC **A04**/MF **A01**
AEG-Telefunken, Heilbronn (Germany, F.R.). Geschaeftsbereicht Halbleiter.
Optoelectronic Devices for Short Range Communication.
Final Report.
W. Schairer. Aug 79, 58p BMFT-FB-T-79-11
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

Glass fiber optics systems for signal transmission over short (30 m) and medium (300 m) range distances are described. Particular emphasis is placed on optical coupling efficiency and frequency behavior. The incorporation of small plastic lenses between the fiber end and LED is shown to increase the optical coupling efficiency by up to a factor of 5. There are two complete systems described: the short range V300P system with a frequency limit of 10 MHz; and the medium range V350P system with a frequency limit of 100 MHz. Ge-doped GaAs diodes are developed with cutoff frequencies of up to 140 MHz.

PAT-APPL-6-138 950 PC **A02**/MF **A01**
Department of the Navy Washington DC
Fiber Optic Sensors.
Patent Application,
P. Mongeon, and C. Buczek. Filed 9 Apr 80, 15p AD-D007 165/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A fiber optical sensor for modulating the intensity of light in an optical fiber in response to mechanical information in the form of linear position, rotation rate or strain. Light from a source is transmitted down the optical fiber, through a birefringent modulatable element positioned between crossed polarizers, and on to a light detector. The birefringence of the modulatable element is susceptible to influence by an external force, such as a mechanical stress or a magnetic field, which is generated by the device being monitored. The external force causes a rotation of the light in the modulatable element and encodes the mechanical information into digital form. (Author)

PAT-APPL-6-139 315 PC **A02**/MF **A01**
Department of the Navy Washington DC
Fiber Optic Light Valve.
Patent Application,
Joseph Wandrack. Filed 11 Apr 80, 8p AD-D007 180/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A mechanically actuated, piezoelectrically powered, fiber optic connected light valve (shutter) utilized as a sensor to detect mechanical motion (pressure) or displacement. A piezoelectric element responds to pressure to generate an electrical signal which is applied to a Kerr cell containing nitrobenzene; the signal in turn renders the nitrobenzene transparent and light via fiber optic means is allowed to pass through the Kerr cell and return to the light source location for sensing. (Author)

PATENT-4 192 573 Not available NTIS
Department of the Navy Washington DC
Variable Power Attenuator for Light Beams.
Patent,
Ray B. Brown. Filed 13 Oct 78, patented 11 Mar 80, 8p AD-D007 194/4, PAT-APPL-951 105
Supersedes PAT-APPL-951 105-78, AD-D005 669.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An improved variable light beam power attenuator which uses a flat mirror and a focusing mirror fixed in a suitably movable structure. Linear movement of this structure varies the diameter of a spot of light illuminating a 'diffraction-limited' aperture of a special shape. A second focusing mirror is provided to collect the 'diffraction-limited' light transmitted by the aperture and to focus or collimate it. A second flat mirror may be used to re-direct the output beam. The mounting arrangement of the first two mirrors relative to the input light beam and the remainder of the power attenuator permit an all mirror system which requires only a single linear motion to change the power level of the transmitted beam. The use of an all-mirror system allows all the advantages of reflective optics over transmitting optics for high power CW (continuous wave) laser beam. (Author)

PATENT-4 193 088 Not available NTIS
Department of the Navy Washington DC
Optical Heterodyne System for Imaging in a Dynamic Diffusive Medium.
Patent,
Steven E. Moran. Filed 2 Aug 78, patented 11 Mar 80, 9p AD-D007 190/2, PAT-APPL-930 283
Supersedes PAT-APPL-930 283-78, AD-D005 513.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A system for an image of an object from a coherent light signal transmitted from the object through a dynamic diffusive medium is provided with a planar surface receiving the signal wavefront, the received wavefront comprising an array of discrete picture elements. A local oscillator signal is mixed with each picture element in a selected order to provide light responsive signals which represent the distribution of power over frequency of each picture element, all of the frequency components of the light responsive signals being included in a first frequency range of selected bandwidth which is centered around an intermediate frequency. A narrow-band electronic filter recieves each of the light responsive signals and removes all frequency components therefrom which are not included in a second, narrow, bandwidth centered around the intermediate frequency. An image of the object is provided by electronic apparatus which receives the filtered signals. (Author)

PB80-177421 PC **A04**/MF **A01**
National Bureau of Standards, Boulder, CO. National Engineering Lab.
Measurement of Optical Fiber Bandwidth in the Time Domain.
Technical note,
Douglas L. Franzen, and G. W. Day. Feb 80, 72p NBS-TN-1019
Sponsored in part by Department of Defense, Washington, DC.

A system is described for determining optical fiber bandwidth from time domain information. A measurement gives the optical fiber transfer function (or frequency response) relating the output waveform to the input. An analysis is given of the variables affecting the measurement. This includes a discussion of such input related topics as launching conditions, mode scramblers, and laser diode sources; output related topics include a discussion of optical detectors. Laser diodes are evaluated with respect to short pulse performance, near field emission, material dispersion limits, and other spectral behavior like chirping; detectors are evaluated with respect to time response, linearity, and uniformity. Overall system architecture, precision, and dynamic range are discussed. A number of bandwidth related topics are briefly presented and typical experimental results given. This includes examples of: mode mixing via microbending, profile compensation, profile dispersion, intramodal broadening, materials dispersion constants, relative magnitude-phase behavior, and Gaussian predictions of frequency response.

PB80-177991 Not available NTIS
National Bureau of Standards, Washington, DC.
Properties of Crystalline Materials for Optics.
Final rept.,
A. Feldman, and R. M. Waxler. 1980, 9p
Pub. in Proceedings of the SPIE Conference on Recent and Future Developments in Medical Imaging II, San Diego, California, August 27-29, 1979, SPIE Journal 204 p68-76 1980.

A tutorial review of refractive index, absorption, birefringence, the electro-optic effect and the photoelastic effect in crystalline materials is presented. Tensorial relationships are presented and related to the symmetry classes of crystals.

SAND-79-1180 PC **A04**/MF **A01**
Sandia Labs., Albuquerque, NM.
Time Delay, Pulse Stretching, and Radiance Distribution for 532-NM Laser Pulses Propagating in Atmospheric Clouds with Application to Satellite Optical Ranging.
R. G. Bradley, and J. C. Matter. Feb 80, 62p
Contract EY-76-C-04-0789

A light pulse traveling through clouds is altered by collisions with water drops in two ways: the arrival time of the pulse is delayed, and the pulse shape is stretched in time. Until now, little experimental data existed to confirm or refute theoretical models of these time smearing effects. This study provides new data, and the authors have developed a relatively simple methodology to generate the time effects for any particular satellite or ground-based receiver. (ERA citation 05:017989)

20G. Particle Accelerators

ANL-HEP-CP-79-47 PC **A02**/MF **A01**
Argonne National Lab., IL.
Polarized Targets.
A. Yokosawa. 1979, 12p CONF-7909111-2
Contract W-31-109-ENG-38
Symposium on the history of the ZGS, Argonne, IL, USA, 13 Sep 1979.

A review is presented of polarized target development for the ZGS at Argonne and for the Fermilab accelerator. (ERA citation 05:016377)

ANL-HEP-CP-80-05 PC **A02**/MF **A01**
Argonne National Lab., IL.
Future Impact of the Experimental Results from the Argonne ZGS.
A. Yokosawa. 10 Jan 80, 19p CONF-791174-3
Contract W-31-109-ENG-38
Meeting on two-nucleon systems and dibaryon resonances, Hiroshima, Japan, Nov 1979.

Experimental programs at Argonne ZGS are reviewed with emphasis on experiments using polarized beams. (ERA citation 05:016378)

BNL-27317 MF **A01**
Brookhaven National Lab., Upton, NY.
Uv Free Electron Lasers for Synchrotron Radiation Sources.
C. Pellegrini. 1979, 23p CONF-791176-1
Contract EY-76-C-02-0016
Japan-USA seminar on synchrotron radiation facilities, Honolulu, HI, USA, 5 Nov 1979.
Microfiche copies only.

The possibility of operating a free electron laser in an electron storage ring similar to those being designed or built as synchrotron radiation sources is

discussed. The laser output power is proportional to the total power radiated as synchrotron radiation in the ring. The electron beam properties make the storage ring particularly suitable for operating a laser in the UV region. Small signal gain per pass larger than one at wavelengths near 600 A can be obtained in a 500 MeV storage ring. (ERA citation 05:016391)

CONF-7910119-2 PC **A02**/MF **A01**
Argonne National Lab., IL.
Methods to Reduce Contamination in Targets Prepared by Vacuum Deposition.
G. E. Thomas, S. K. Lam, and R. W. Nielsen.
1979, 16p
Contract W-31-109-ENG-38
Annual conference of the I.N.T.D.S. Boston, MA, USA, 1 Oct 1979.

A study was performed to determine the source of impurities found in accelerator targets prepared by vacuum vapor deposition. (ERA citation 05:016380)

LA-8235-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Rf Coaxial Couplers for High-Intensity Linear Accelerators.
J. J. Manca, and E. A. Knapp. Feb 80, 14p
Contract W-7405-ENG-36

Two rf coaxial couplers that are particularly suitable for intertank connection of the disk-and-washer accelerating structure for use in high-intensity linear accelerators have been developed. These devices have very high coupling to the accelerating structure and very low rf power loss at the operating frequency, and they can be designed for any relative particle velocity beta > 0.4. Focusing and monitoring devices can be located inside these couplers. (ERA citation 05:016384)

ORNL/TM-6632 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Preliminary Study of Pseudorandom Binary Sequence Pulsing of ORELA.
N. M. Larson, and D. K. Olsen. Mar 80, 80p
ENDF-290
Contract W-7405-ENG-26

It has been suggested that pseudorandom binary sequence (PRBS) pulsing might enhance the performance of the Oak Ridge Electron Linear Accelerator (ORELA) for neutron-induced, time-of-flight (TOF) cross-section measurements. In this technical memorandum, equations are developed for expected count rates, statistical variances, and backgrounds for a pulsing scheme in which a PRBS is superimposed on the periodic equalintensity ORELA bursts. Introduction of the PRBS modification permits neutrons of different energies originating from different bursts to reach the detector simultaneously, and the signal corresponding to a unique flight time to be extracted mathematically. Relative advantages and disadvantages of measurements from conventional and PRBS pulsing modes are discussed in terms of counting statistics and backgrounds. Computer models of TOF spectra are generated for both pulsing modes, using as examples a 20-meter exp 233 U fission-chamber measurement and a 155-meter exp 238 U sample-in transmission measurement. Detailed comparisons of PRBS vs conventional results are presented. This study indicates that although PRBS pulsing could enhance ORELA performance for selected measurements, for general ORELA operation the disadvantages from PRBS pulsing probably outweigh the advantages. (ERA citation 05:016347)

RL-78-024 MF **A01**
Science Research Council, Chilton (England). Rutherford Lab.
NMR Dispersion Measurement of Dynamic Nuclear Polarization.
K. Davies, and S. F. J. Cox. Jan 78, 17p
U.S. Sales Only. Microfiche copies only.

The feasibility of monitoring dynamic nuclear polarization from the NMR dispersive susceptibility is examined. Two prototype instruments are tested in a polarized proton target using organic target material. The more promising employs a tunnel diode oscillator, inside the target cavity, and should provide a precise polarization measurement working at a frequency far enough from the main resonance for the disturbance of the measured polarization to be negligible. Other existing methods for measuring target polarization are briefly reviewed. (Atomindex citation 09:399568)

20H. Particle Physics

AERE-R-9502 PC **A02**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England). Nuclear Physics Div.
Note on the Capture gamma-Ray Spectrum of Natural Ti Produced by Thermal Neutrons.
M. G. Sowerby. Jun 79, 12p
U.S. Sales Only.

The data on the capture gamma-ray spectrum of natural Ti produced by thermal neutrons are reviewed and it is found that there is no sizeable unresolved component to the spectrum. A recommended set of data based on the experimental data is produced and some general comments made about the nature of the effort required to produce improved data for other materials. (Atomindex citation 10:493300)

ANL-HEP-CP-80-07 PC **A03**/MF **A01**
Argonne National Lab., IL.
Review of Nucleon-Nucleon Scattering Experiments and Many Dinucleon Resonances.
A. Yokosawa. 20 Jan 80, 35p CONF-791174-2
Contract W-31-109-ENG-38
Meeting on two-nucleon systems and dibaryon resonances, Hiroshima, Japan, Nov 1979.

Structures appearing in various experimental data (particularly those with polarized beams) in nucleon-nucleon systems are reviewed. A number of candidates are presented for dibaryon resonances which can couple to nucleon-nucleon systems. (ERA citation 05:017015)

ANU-P-731 PC **A06**/MF **A01**
Australian National Univ., Canberra. Dept. of Nuclear Physics.
Annual Report 1978.
1979, 109p
U.S. Sales Only.

Contents include a description of research equipment and computing procedures in operation, and a review of research undertaken during the year. Studies included light ion induced reactions, Coulomb excitation, heavy ion transfer reactions, experiments involving (HEAVY-ION, XN) reactions and ion-solid interactions. Laboratory staff and department publications are also listed. (Atomindex citation 10:481527)

BARC-978 PC **A09**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Annual Report of the Nuclear Physics Division (For) Period Ending December 31, 1976.
C. L. Thaper, N. N. Ajitanand, and S. Kailas.
1978, 191p
U.S. Sales Only.

The research and development (R and D) activities of the Nuclear Physics Division of the Bhabha Atomic Research Centre, Bombay, during the calendar year 1976 are reported. The R and D activities of the Division cover the areas of nuclear physics, fission physics and solid state physics. Various experimental techniques and instruments developed are also briefly described. (Atomindex citation 10:493305)

BONN-HE-78-13 PC **A02**/MF **A01**
Bonn Univ. (Germany, F.R.). Physikalisches Inst.
Analysis of the Reaction pi exp - p Implies exp - Ppn at 10 and 16 GeV/C.
Oct 78, 12p
U.S. Sales Only.

Antiproton-proton pairs and antiproton-neutron pairs produced in the reaction pi exp - p implies exp - ppn, were studied in the mass range from threshold to 2.6 GeV on the basis of 4 .(period on line) 10 exp 4 events at 10 GeV/c and 2 .(period on line) 10 exp 4 events at 16 GeV/c incident momentum. The cross section for peripheral production of exp - pn pairs is significantly larger than for exp - pp pairs. The exp - pp production mechanism is consistent with the predictions of the one pion exchange model, whereas the exp - pn production cannot be sufficiently described by that model. A partial wave analysis of the exp - pp system, assuming pure one pion exchange, shows that we need for a reasonable description of our data in addition to the JP = 3 exp - resonance at 2.11 GeV and the 4 exp + resonance at 2.26 GeV, found in an analysis of a formation experiment (exp - pp implies pi exp + pi exp -), two further resonances: a 1 exp - state at 1.92 GeV and a 2 exp + state at 2.02 GeV. (Atomindex citation 10:435309)

CEA-CONF-4120 PC **A06**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique des Particules Elementaires.
New Particles at SPEAR.
F. Pierre. 1977, 105p CONF-7609192-2
International school of elementary particle physics, Basko Polje, Yugoslavia, 19 Sep 1976.
U.S. Sales Only.

The search for new particles produced in e exp + e exp - annihilation at SPEAR has proven to be highly successful during the last year or two. In the energy range from 2.4 GeV to 7.6 GeV, there are two extremely narrow states with J=1 exp − , PSI(3095) and PSI'(3684), and there are two scaling regions, below 3.5 GeV and above 5 GeV, characterized by a constant value of R. The transition region near 4 GeV shows rather complicated structure with several broad enhancements in hadron production. Radiative decays of the PSI'(3684) have led to the discovery of at least three, more likely four, even C states with masses between 3.40 GeV and 3.55 GeV. Two groups at DESY observed a fifth state with a mass of 2.8 GeV decaying of two photons, in addition to the Psub(C) (identical to KHI(3.50)). The present spectrum of states is consistent with the number of states expected from the hypothesis of one new quark bound to its antiquark. In particular the PSI(3095) and KHI(2850) could be taken as L=0 ground states, while the KHI states near 3.5 GeV are good candidates for L=0, 1 states. Present limits for the production of additional states which couple directly to the virtual photon are rather stringent for very narrow states only; they do not exclude broader states with leptonic widths comparable to that of the PSI(4414). The two states at 1.87 GeV produced above 3.9 GeV have the properties expected for the lowest-lying nonstrange charmed mesons: mass, narrowness, recoil mass spectra, decays involving kaons, exoticity of observed charged decay, and uniformity of the Dalitz plot population for the K exp +- pi exp -+ pi exp - + decay. Finally, anomalous e mu events have a simple explanation in terms of pair-production of sequential heavy lepton of mass 1.6 - 2.0 GeV. (Atomindex citation 09:406291)

CEA-CONF-4305 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Cadarache, Saint-Paul-les-Durance (France). Dept. des Reacteurs a Eau.
Comments About Resonance Parameters of Fe Below 650 KeV: Old Evaluations, and Recent Experimental Data.
P. Ribon. 1977, 23p CONF-771233-8
Meeting on neutron data of structural materials, Geel, Belgium, 5 Dec 1977.
U.S. Sales Only.

An evaluation of Fe resonance parameters is presented, which was made by modification of ENDF-B, considering the capture cross section up to 650 keV and assuming self-screening as very important. Statistically generated resonances were introduced for exp 56 Fe up to 650 keV fitted as much as possible to resolved resonances, and known resonances were included for the other Fe isotopes. In the file there are 35 resonances for exp 54 Fe up to 250 keV, 55 for exp 57 Fe up to 190 keV and 206 for exp 56 Fe (81 known, 125 assumed). The Cadarache values of the average capture cross section are compared with Oak Ridge values from 10 keV to 650 keV. The recommended values have an accuracy (standard deviation) varying between 3 and 13% (8% on an average). Examples are given of the importance of self-screening: the d wave contribution is the most important. Comparisons are made between various

sets of resonance data and width values of self-screening used; the disagreements, which are systematic are of the order of 10-20%. Some recommended values for the average parameters as a function of energy are also given. (Atomindex citation 10:468232)

CEGB-RD/B/N-4423 PC **A02**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Brief Description of the ENDF/B-V Format Adopted for Use in the UK Decay and Fission Product Yield Data Files.
A. Tobias. Nov 78, 22p
U.S. Sales Only.

Due to limitations in the ENDF/B-IV format, for the coding of radioactive decay data, it has been necessary to extend the format to version V. A brief, but self-contained description is given on the interpretation of ENDF/B-V format adopted for use in the UK for data on both radioactive decay and fission product yields. (Atomindex citation 10:468564)

CENBG-7819 PC **A03**/MF **A01**
Bordeaux-1 Univ., Gradignan (France). Centre d'Etudes Nucleaires.
Angular Distribution Analysis for Quasi-Elastic Transfer Reactions Induced in exp 209 Bi Targets with Heavy Ions.
Y. Llabador, F. Hubert, A. Fleury, D. Gardes, and M. F. Rivet. 1978, 28p
U.S. Sales Only.

An analysis of angular distributions for quasi-elastic transfer reactions is proposed. The formalism used is derived from the general treatment of multinucleon transfer in the limits of DWBA approximation. It appears that, for heavy ions, the use of real potentials with real trajectories remains a good approximation in the window of l space concerned with quasi-elastic transfer reactions. This analysis has been tested by a series of experimental data obtained by bombardment of exp 209 Bi targets by exp 14 N, exp 16 O, exp 19 F, exp 40 Ar and exp 40 Ca. For incident energies near the coulomb barrier, the deflection angle depends strongly on the excitation energy of the system so that a window of Q values leads to very wide angular distributions. A slow decrease of the radius parameter with the increase of the Z sub 1 Z sub 2 product has been observed. This result can be correlated by an interaction distance (d=2.7-3 fm) between half-density radii of the two colliding nuclei. (Atomindex citation 10:481578)

CENBG-7901 PC **A03**/MF **A01**
Bordeaux-1 Univ., Gradignan (France). Centre d'Etudes Nucleaires.
Fusion de-Excitation Process in Heavy Ion Interactions.
A. Fleury. 1979, 33p
In French.
U.S. Sales Only.

Various aspects of compound nucleus formation and de-excitation are analysed with particular emphasis on de-excitation by particle emission and fission. Calculations of level densities are described and the validity of various approximations studied. The explanatory and predictive possibilities of the statistical model are pointed out. (Atomindex citation 10:493403)

CERN-77-16 PC **A05**/MF **A01**
European Organization for Nuclear Research, Geneva (Switzerland).
K Exp - N and K exp - p Elastic Scattering in K exp - D Collisions from 1.2 to 2.2 GeV/C.
Y. Declais, J. Duchon, M. Louvel, J. P. Patry, and J. Seguinot. 22 Aug 77, 92p
U.S. Sales Only.

This report contains the detailed description of an experiment which has determined the differential cross section of the K exp - n implies K exp - n elastic scattering reaction. The results are 12 angular distributions spanning the K exp - n c.m. energy interval from approximately 1.86 to approximately 2.32 GeV. The measurements have been performed at the CERN PS using a beam of negative kaons with momenta from 1.2 to 2.2 GeV/c incident on a liquid deuterium target. By means of electronic apparatus the process K exp - d implies K exp - n psub(s) was identified and recorded; this process is basically the same as the K exp - n elastic reaction insofar as the spectator proton psub(s) has low momentum. The elastic reaction was derived from the above process by taking into account the Fermi motion of the target neutron and by introducing the appropriate corrections to compensate for the effects due to the composite nature of the neutron (double-scattering, final state interaction). These results, constituting the first extensive collection of data on the pure isospin 1 anti KN state have been used in conjunction with other data in a preliminary partial wave analysis of the anti KN elastic system over the c.m. energy range from 1.84 to 2.23 GeV. Mainly for testing purposes, a similar amount of data has been collected for the K exp - p elastic reaction also from K exp - d collisions (K exp - d implies K exp - p nsub. (Atomindex citation 09:406277)

CONF-7906151-1 PC **A03**/MF **A01**
Brown Univ., Providence, RI.
Classical and Quantum Dynamics of Two-Dimensional Nonlinear Field Theories: A Review.
A. Jevicki. 1979, 31p
Contract EY-76-C-02-3130
Conference on nonlinear partial differential equations in applied sciences, Kingston, RI, USA, Jun 1979.

Progress in understanding and solving a large class of two-dimensional nonlinear quantum field theories is reviewed. The discovery and development of the inverse scattering method for solving partial differential equations, and development of new perturbative methods are discussed. The generalized Bethe-ansatz method and its application to exactly diagonalize a fermionic problem are covered. 52 references. (ERA citation 05:017034)

CONF-791223-5 PC **A02**/MF **A01**
Argonne National Lab., IL.
Fast Neutron Capture Cross Section Measurements, Evaluations and Model Calculations of Fission Product Nuclei.
W. P. Poenitz. 1979, 10p
Contract W-31-109-ENG-38
NEANDC specialist meeting on neutron cross sections of fission product nuclei, Bologna, Italy, 12 Dec 1979.

The fast-neutron capture cross sections of elemental rhodium, palladium, neodymium, and samarium were measured in the energy range 0.5 to 4.0 MeV relative to the standard capture cross section of gold. A large liquid scintillator and the time-of-flight technique were used in these measurements. Experimental data are rare or non-existent in this energy range and evaluations differ substantially, with a factor of 5 being common. The present data were used together with other experimental data and nuclear model calculations in order to provide a consistent set of isotopic and elemental capture cross sections. 5 figures. (ERA citation 05:017079)

CONF-800114-3 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Comparison of Fusion Cross Sections for exp 10 B + exp 16 O and exp 12 C + exp 14 N Systems.
J. Gomez del Campo. 1980, 25p
Contract W-7405-ENG-26
Symposium on nuclear physics, Oaxtepec, Mexico, 3 Jan 1980.

The cross sections for fusion are compared for the exp 10 B + exp 16 O and exp 12 C + exp 14 N systems for bombarding energies up to 17 MeV/A. The energy spectra, angular distributions and relative yields of the evaporation residues are extracted and, by comparison to simple kinematical analysis and Hauser-Feshbach calculations, it is concluded that they are consistent with complete fusion and equilibrium decay. Coincidence measurements for the exp 14 N + exp 12 C system at E sub 14 /sub N/ = 182 MeV are also presented and confirm the identification of evaporation residues based on singles measurements of the Z distributions. The excitation functions for fusion for the exp 14 N + exp 12 C and exp 10 B + exp 16 O systems show significant differences that cannot be explained in terms of simple macroscopical models. For the highest energies studied the fusion cross sections decrease as 1/E/sub cm/ for both systems; this result confirms the existence of a maximum absolute angular momentum limit of approx. 27 h-bar. 16 figures. (ERA citation 05:017046)

COO-1545-270 PC **A02**/MF **A01**
Ohio State Univ., Columbus. Dept. of Physics.
Masses and Mixing Angles in SU(5) Gauge Model.
S. Nandi, and K. Tanaka. 1979, 11p
Contract AC02-76ER01545

Georgi and Jarlskog mass relations m/sub mu /m/sub e/ = 9m/sub s//m/sub d/, m/sub b/ = m/sub tau/ are obtained above the grand unification mass M = 10 exp 15 GeV with two approx. 5's and one approx. 45 Higgs representations of SU(5) and a discrete symmetry. In the lowest order, the Kobayashi-Maskawa angles are found to be s sub 2 = -(m/sub c//m/sub t/) /sup 1/2/ and s sub 3 = -(m/sub u//m/sub t/) /sup 1/2//s sub 1 , where s sub 1 is the sine of the Cabibbo angle. The CP violation is considered, and the b quark decays predominantly into c quarks with lifetime of tau/sub b/ approx. equal to 10 exp -13 s for m/sub t/ = 25 GeV. (ERA citation 05:017028)

COO-2978-5 PC **A02**/MF **A01**
Cincinnati Univ., OH.
Inelastic Strong Interactions at High Energies. Annual Progress Report, June 1, 1979-May 1, 1980.
P. Suranyi. Feb 80, 9p
Contract EY-76-S-02-2978

Investigations in the area of Grand Unified Field Theories were begun. Various ways of breaking the SU(5) symmetric theory of Georgi and Glashow were studied. As usual, an approx. 24 of Higgs breaks the symmetry from SU(5) to SU(3)/sub c/xSU(2)xU(1). It was found that an approx. 45 of Higgs is acceptable for breaking the symmetry from SU(3)/sub c/xSU(2)xU(1) to SU(3)/sub c/xU(1)/sub em/. In addition phenomenologically correct quark-lepton mass ratios are obtained by use of renormalization-group techniques if there are 6 generations of particles in the theory. Efforts directed at the development of approximate methods for extracting information from quantum field theories were continued. The quantum mechanics of polynomial potentials as a model for quantum field theories was investigated. A perturbation expansion for the energy levels and wave functions was constructed and has been proven to be convergent for arbitrary values of the coupling constants, in contrast to ordinary perturbation expansions that have a zero radius of convergence. The physical significance of the new perturbation expansions was explored both in the weak and strong coupling limits. (ERA citation 05:017029)

COO-3235-87 PC **A03**/MF **A01**
Brown Univ., Providence, RI. Dept. of Physics.
Nuclear Excitations and Reaction Mechanisms. Progress Report, November 1, 1978-October 31, 1979.
1 Nov 79, 29p
Contract EY-76-S-02-3235

Brief administrative-type summaries are given of work in the following areas: the nuclear Compton amplitude, dispersion relations, model calculations, electroexcitation sum rules, effects of nucleon size on photonuclear transitions and internal nuclear excitations, wave function formalisms in the channel coupling array theory, new n-particle scattering theory, atomic and molecular bound-state calculations, test of bound-state approximations in many-body scattering theories, quantum theory for nonhermitian operators, and variational principles for particles and fields in Heisenberg matrix mechanics. (ERA citation 05:017122)

COO-3496-74 PC **A03**/MF **A01**
Rochester Univ., NY. Dept. of Chemistry and Physics.
Experimental Summary of the International Symposium on Continuum Spectra of Heavy Ion Reactions.
J. R. Huizenga. Dec 79, 39p UR-NSRL-210, CONF-791219-4
Contract EY-76-S-02-3496
International symposium on Continuum Spectra of Heavy Ion Reactors, San Antonio, TX, USA, 3 Dec 1979.

This conference summary type paper addresses four topics covered in the symposium: properties of damped or deep-inelastic collisions at energies less than 5 MeV per nucleon above the Coulomb barrier; emission of statistical light particles in damped collisions; emission of fast (nonstatistical) particles in heavy-ion collisions (projectile breakup or fragmentation - elastic or inelastic; preequilibrium particles - hot spots, Fermi jets, etc.; particle emission from neck rupture); and heavy-ion fusion. Seventeen conclusions are drawn. 23 figures, 3 tables, 90 references. (ERA citation 05:017098)

CRN-CNPA-78-6 PC **A03**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
General Theory of Intensity Correlation on Light Scattering.
A. A. Villaeys. 1978, 37p
U.S. Sales Only.

A general theory for spatio-temporal intensity correlation measurements for a scattered beam is developed. A completely quantum mechanical description for both excitation and detection set up is used. This description is essentially valid for weak incident light beams and single photon absorption processes. From a unified point of view, both stationary as well as time-resolved experiments are described. The interest for such experiments in the study of processes like resonance Raman scattering and resonance fluorescence is emphasized. Also, an observable coherent contribution associated with different final levels of the target atoms or molecules is obtained, a result which cannot be reached by intensity measurements. (Atomindex citation 10:481461)

CRN-PN-79-3 PC **A02**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Mean Lifetime of the 6.38 MeV 8 exp + State in exp 54 Fe.
G. Guillaume, and P. Fintz. 1979, 12p
In French.
U.S. Sales Only.

The lifetime of the 6.38MeV 8 exp + state in exp 54 Fe populated in the exp 50 Cr(exp 6 Li,pn) reaction has been measured by using Doppler shift attenuation method: gamma -rays were observed in coincidence with neutrons. The mean lifetime is tau=(164+40-30)fs. E2-transition strengths in exp 54 Fe are discussed and compared to the predictions of shell-model calculations. (Atomindex citation 10:493416)

DESY-L-Ueb-220 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Collinear and Infrared Divergences for Two Gluon Annihilation of a Quark-Antiquark Pair.
A. V. Smilga. Apr 78, 17p
In German.
U.S. Sales Only.

For the process of quark-antiquark anihilation the gluon corrections are given. Two different ways for averaging over colours are presented: 1) In dependent averaging, if quark, antiquark, and each emitted gluon form an incoherent mixture with equal statistical weighing of all pure colour states; 2) correlated averaging, if the initial state is considered to be white. (Atomindex citation 10:431790)

DESY-78/16 MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Gluons in Quarkonium Decay.
K. Koller, and T. Walsh. Mar 78, 23p
U.S. Sales Only. Microfiche copies only.

We discuss what can be learned of the exp 3 S sub 1 quarkonium decay QantiQ implies 3 gluoans QantiQ implies gamma + 2 gluons. The former is a way to find gluon jets and test QCD. The latter also allows us to measure gluoan + gluon implies hadrons and look for pure gluonic resonances. (Atomindex citation 10:431762)

DESY-78/19 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron), Hamburg (Germany, F.R.).
S-P Wave Interference in K exp + K exp - Photoproduction Near K exp + K exp - Threshold.
D. C. Fries, P. Heine, H. Hirschmann, A. Markou, and E. Seitz. Apr 78, 9p
U.S. Sales Only.

A mass dependent asymmetry was observed in decay angular distribution of a photoproduced K exp + K exp - system near the K exp + K exp - threshold. The corresponding moments <Yo sub 1 > have been evaluated. Interpreting the asymmetry as an S-P wave interference due to the states S* sub 993 (O exp +) and sub 1019 (1 exp -) one can compute the moments <Yo sub 1 > through an amplitude analysis. The theoretical calculation reproduces the experimental results well, if one assumes a real S wave amplitude for the S* sub 993 . The data can not be explained by a non-resonant real S wave. Other possibilities have been discussed. An estimate of the photoproduction cross section of the S* implies K exp + K exp - can be given on the basis of the above hypothesis. (Atomindex citation 09:406279)

DESY-78/20 MF **A01**
Deutsches Elektronen-Synchrotron (DESY), Hamburg (Germany, F.R.).
Measurement of the F exp 0 (1270) Polarization in the J/psi Implies F exp 0 gamma Decay.
G. Alexander, L. Criegee, H. C. Dehne, K. Derikum, and R. Devenish. Apr 78, 7p
U.S. Sales Only. Microfiche copies only.

The polarization of the f exp 0 (1270) and rho exp 0 (770) produced in the J/psi decays into f exp 0 gamma and rho exp 0 pi exp 0 are measured in e exp + e exp - collisions at 3.1 GeV. A fit to the f exp 0 production and decay angular distributions yields the values A sub 1 /Ao = 0.6 +0.3 and A sub 2 /Ao = 0.3sup(+0.6)sub(-1.6) where Alambda are the f exp 0 helicity amplitudes. These results are in good agreement with the values predicted from a QCD-two-gluon-exchange model. In addition an upper limit of 2.3 x 10 exp -4 is obtained for the J/psi implies f' exp 0 (1514) gamma decay branching ratio which implies GAMMA(J/psi implies f' gamma)/GAMMA(J/psi implies f exp 0 gamma) <= 0.12 +- 0.05. (Atomindex citation 09:416156)

DESY-78/31 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Delta (1232) Production by Virtual Photons.
K. Wacker, G. Drews, J. Knobloch, H. Nagel, and E. Rabe. Jul 78, 24p
U.S. Sales Only.

The reaction gamma sub(v)p implies p pi exp + pi exp - was studied in the W, Q exp 2 region 1.3 to 2.8 GeV, 0.3 to 1.4 GeV exp 2 using the streamer chamber at DESY. An analysis of delta exp ++ (1232) and delta exp 0 (1232) production via gamma sub(v)p implies delta pi is presented. The W dependence, production angular distribution and decay distribution of delta exp ++ in the channel delta exp ++ pi exp - is similar to that found in photoproduction. At small momentum transfers the Q exp 2 dependence of delta exp ++ production follows that of the rho propagator as predicted by VDM; at large momentum transfer there is little Q exp 2 dependence. The W dependence of delta exp 0 production and its ratio with respect to delta exp ++ production is similar to that found in photoproduction. (Atomindex citation 10:431841)

DESY-78/35 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron Hamburg (Germany, F.R.).
Recent E exp + E exp - Results from DORIS.
G. Weber. Jul 78, 22p CONF-780788-4
International symposium on high energy multiparticle dynamics, Tabor, Czechoslovakia, 2 Jul 1978.
U.S. Sales Only.

This paper contains some new results on the heavy lepton tau, evidence for the F- and F*- Mesons, observation of the Upsilon (9.46) Resonance, jets in hadron production in e exp + e exp - annihilation and status of PETRA. (Atomindex citation 10:428608)

DESY-78/36 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron Hamburg (Germany, F.R.).
QCD Predictions for Jets in E exp + E exp - Annihilation: Angular Correlations and Asymmetries.
G. Kramer, G. Schierholz, and J. Willrodt. Jul 78, 13p
U.S. Sales Only.

The topological features of hadron jets in e exp + e exp - annihilation may reliably be calculated in QCD perturbation theory. To second order the final state hadrons fall into quark-antiquark and quark-antiquark-gluon initiated jets. The latter induce angular asymmetries which are extensively studied. (Atomindex citation 10:435202)

DESY-78-38 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Operator Solution to Broken QCD(N) sub 2 for Massless Quarks.
P. Mitra, and P. Roy. Jul 78, 10p
U.S. Sales Only.

By explicit construction of solutions in gauges satisfying the Lorentz condition we give an operator realization of the dynamically broken Patrascioiu phase in QCD(N) sub 2 for massless quarks. The SU(N) colour gauge group is reduced to its maximal abelian subgroup. The N-1 diagonal gluons become massive free fields and there is a massless free U(1) current. The contrast wtih the 't Hooft phase, established by the 1/N method, supports the idea of two distinct phases. (orig.) 891 WL. (Atomindex citation 10:431779)

DESY-78-39 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron Hamburg (Germany, F.R.).
Study of Jets in Electron Positron Annihilation into Hadrons in the Energy Range 3.1 to 9.5 GeV.
C. Berger, W. Lackas, G. Alexander, L. Criegee, and O. Achterberg. Aug 78, 15p
U.S. Sales Only.

From an analysis of data taken with the detector PLUTO at the DORIS storage rings we have obtained evidence for jet structure in e exp + e exp - annihilation with hadrons. Results for mean sphericity, mean thrust, the angular dependence of the jet axis, and <p(transverse)> and <p(parallel)> with respect to the jet axis are presented. At 9.4 GeV we also discuss the angular dependence of the charged and neutral deposited energy with respect to the jet axis. (Atomindex citation 10:428578)

DESY-78-75 PC **A03**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Confinement and Chiral Symmetry Breaking in CP/Sup n-1/ Models with Quarks.
A. D'Adda, P. Di Vecchia, and M. Luescher. Dec 78, 39p
U.S. Sales Only.

We study the low energy physics of quarks in two dimensions, which are minimally coupled to CP/sup n-1/ fields. Within the 1/n expansion, heavy quarks are confined, the U(1)A chiral symmetry is spontaneously broken and a light isoscalar pseudoscalar boson is avoided by means of the axial anomaly. (Atomindex citation 10:468035)

DESY-78/76 PC **A03**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Isovector Form Factors of the Nucleon in Meson Theory.
F. Gutbrod, and G. Hartmann. Dec 78, 37p
U.S. Sales Only.

We present a calculation of the nucleon isovector form factors for low momentum transfer. Our model is based on skeleton diagrams in pseudoscalar mu N interaction where unknown parameters describing higher-order corrections are fixed such that a rho-meson is generated dynamically with the correct properties. The normalization of the form factors and the radii agree well with experiment. For -q exp 2 up to 1 GeV exp 2 the contributions of the pi w-intermediate state do not fall off rapidly enough to give perfect agreement with the dipole formulae. (Atomindex citation 10:468073)

DESY-79/05 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Deep Inelastic Quantum Chromodynamic Charm Leptoproduction.
M. Glueck, and E. Reya. Jan 79, 12p
U.S. Sales Only.

The consequences of calculating inclusive charm (or any heavy quark flavor) electroproduction are investigated using a virtual Bethe-Heitler photon-gluon pair creation process. Implications for the light quark sea of the nucleon are studied by comparison with recent mu p data in the small x region. Predictions for heavy quarkonium (J/psi,UPSILON) electroproduction are also given. For example, at Q exp 2 = 10 GeV exp 2 and x = 0.01 we find F sub 2 (charm) approximately equal to 0.08 and F sub 2 (psi) approximately equal to 0.003. (Atomindex citation 10:468068)

DESY-79/09 PC **A03**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Heavy Quarkonia and Asymptotic Freedom.
G. Krasemann, and S. Ono. Feb 79, 27p
U.S. Sales Only.

We use semiclassical methods to discuss the scaling behavior of quarkonium level splittings up to M(Q anti Q) = 200 GeV. Special emphasis is laid on the effects of asymptotic freedom, which are found to be essential for M(Q anti Q) >= 30 GeV. The bound t anti t system will almost look like the UPSILON system except that R = delta M (exp 3 P exp 2 - exp 3 P exp 1) / delta M (exp 3 p1 - exp 3 P exp 0) is larger than 0.8. In the UPSILON system R will already be close to 0.8. (Atomindex citation 10:468098)

DESY-79/14 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Properties of Hadron Final States in E exp + E exp - Annihilation at 13 GeV and 17 GeV Center of Mass Energies.
R. Brandelik, W. Braunschweig, K. Gather, B. Jaax, and V. Kadansky. Feb 79, 15p
U.S. Sales Only.

We have observed e exp + e exp - implies hadrons at C.M. energies of 13 GeV and 17 GeV at PETRA by using the TASSO detector. We find R(13 GeV) = 5.6 +- 0.7 and R(17 GeV) = 4.0 +- 0.7. The additional systematic uncertainty is 20%. Comparing inclusive charged hadron spectra, we observe scaling between 5 GeV and 17 GeV for x = p/p/sub beam/ > 0.2; however the 13 GeV cross section is above the 17 GeV cross section for smaller x. This may be due to copious b anti b production. The events become increasingly jet like at high energies as evidenced by a shrinking sphericity distribution with increasing energy. (Atomindex citation 10:468170)

DOE/ER/01388-806 PC **A03**/MF **A01**
Washington Univ., Seattle. Dept. of Physics.
Charge Symmetry Breaking in the Neutron Proton System.
C. Y. Cheung, E. M. Henley, and G. A. Miller. Dec 79, 27p RLO-1388-806
Contract EY-76-C-06-1388

Two consequences of charge symmetry breaking (CSB) in the n-p system are examined. In n-p elastic scattering, CSB nuclear forces cause a difference between the polarizations of the neutron and the proton scattered in opposite directions in the center of mass system. The expected differences in polarizations due to one boson exchanges, particularly a photon exchange, isospin mixed mesons, and a pion (with the n-p mass difference taken into account), are computed. The calculated polarization difference is typically of the order of several tenths of a percent. In np implies d pi exp 0 , the CSB of nuclear forces can be tested by measuring the asymmetry of the angular distribution of deuterons about 90 exp 0 in the center of mass frame. The expected asymmetry is calculated for one boson exchange CSB mechanisms, as in the elastic scattering. The asymmetry caused by the mixed n- pi exp 0 exchange is dominant, but all of the mechanisms contribute asymmetries with similar angular dependences. The maximum assymmetry is about 0.8% at exp 0 ; the average is about 0.2%. (ERA citation 05:017032)

DOE/TIC-11100 PC **A06**/MF **A01**
South Carolina Univ., Columbia. Dept. of Physics and Astronomy.
Experimental and Theoretical Investigations of the Decays of exp 206 Fr and exp 208 Fr.
B. G. Ritchie. 1979, 114p
Contract EY-76-C-05-0033
Thesis.

exp 206 Fr and exp 208 Fr were mass separated and observed with large-volume semiconductor detectors in calibrated geometries. Alpha, gamma, and electron singles and gamma-gamma and gamma-electron coincidence data were taken. The alpha decay experiments permitted the determination of the alpha branching ratios for exp 206 exp 208 Fr as well as exp 205 exp 207 Fr. The method used includes the information obtained from the electron capture decay studies of those nuclei. The alpha branching ratios obtained are generally higher than those reported previously. Energies and half-lives are in general agreement with previous measurements. The alpha measurements also revealed the presence of a heretofore unobserved alpha-emitting isomer in exp 206 Fr. The isomer has a half-life of 0.7 +- 0.1 seconds, and the energy of the associated alpha decay is 6.930 +- 0.005 MeV. Gamma data taken with the alpha measurements suggest that the isomeric level is 531 keV above the exp 206 Fr ground state, with the associated alpha decay populating a level at 391 keV in the exp 202 At nucleus. Measured alpha branching ratios were analyzed with the Rasmussen reduced width formalism. All observed francium decays were deduced to be unnindered. This study produced detailed level schemes for exp 206 Rn and exp 208 Rn. The gamma and electron data permitted the determination of internal conversion coefficients, multipolarities, spins, and parities. It appears from systematics that two different bands of states above J/sup pi / = 4+ are populated by in-beam studies. The deduced level scheme of exp 208 Rn was studied in the interacting boson approximation (IBA) with the computer code PHINT. The level scheme is readily explained with this model up to around 2 MeV. Good agreement between theory and experiment was also obtained for exp 204 Rn and exp 206 Rn. (ERA citation 05:017104)

DOE/TIC-11109 PC **A04**/MF **A01**
Argonne National Lab., IL.
Nuclear Structure and Heavy-Ion Reactions.
J. P. Schiffer. 1979, 53p
Contract W-31-109-ENG-38

There are simple resonance phenomena appearing in heavy-ion reactions, that must have their origin in the quantum-mechanical structure of the nucleus. While there are many points of similarity between the phenomena in heavy-ion reactions and those in light-ion physics, it is by no means clear to what extent the framework of the single-particle optical potential is adequate to describing and classifying the giant resonance-like features that emerge in a variety of heavy-ion reactions. It seems probable that, when these features are better understood, they will reveal new simple symmetries in nuclear structure. 18 figures. (ERA citation 05:017125)

EAV-01/78 MF **A01**
Universidade Federal do Rio de Janeiro (Brazil). Inst. de Fisica.
'Square - Root' Potential and the Charmonium.
H. F. de Carvalho, and R. Chanda. 2 Jan 78, 14p
U.S. Sales Only. Microfiche copies only.

An analysis is made of the spectroscopy of charmonium using a confining potential of type V(r) = Krsup(n) - 4 alpha s/3r +C, with N>O; alpha s is the gauge coupling, K and C are constants. The best results, compared with the experimental data, are obtained for n=1/2. (Atomindex citation 10:431736)

EFI-157(76) MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Dependence of rho exp - Meson Photoproduction Cross Section in Forward Direction on the Atomic Number of a Target Nucleus.
M. V. Anokhin, A. R. Kanetsyan, and E. R. Markaryan. 1976, 35p
In Russian.
U.S. Sales Only. Microfiche copies only.

A study was made of rho exp - meson photoproduction in forward direction on exp 4 Be, exp 12 C, exp 27 Al, exp 64 Cu nuclei at the energies of incident quanta up to 4.5 GeV. Measurements were made with a double-arm spectrometer permitting under the conditions of heavy background the rho exp - mesons to be isolated. No individual channels of the reproduction reactions were isolated. The experiment was simulated by a Monte-Carlo method with the use of the standard program FOWL (CERN) with an increased counting rate. It was found that dsigma/dt in forward direction was approximately Asup(0.8) at X sub 32 = O.85. This does not contradict the predictions based on the Glauber formalism for an incoherent process. (Atomindex citation 09:406265)

EFI-242(35)-77 MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Measuring Cross Section of Hadron-Nucleus Interaction for High Energies.
R. M. Martirosov. 1977, 21p
In Russian.
U.S. Sales Only. Microfiche copies only.

The review of experimental data on NN and NA cross sections of interaction for high energies and of their dependence on energy and atomic number of matter is made. The possibility of the "Pion" Aragats facility for measuring the cross section of inelastic interaction of nucleons and pions with nuclei for energy above 500 GeV is shown. (Atomindex citation 10:468198)

EFI-245(38)-77 MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Electron-Positron Annihilation at High Luminosity Colliding BEAMS.
G. V. Grigoryan, and A. Yu. Khodzhamiryan. 1977, 39p
In Russian.
U.S. Sales Only. Microfiche copies only.

Experiments are discussed, which can be carried out at the electron-positron storage rings with increased luminosity (up to 10 exp 34 cm exp -2 sec exp -1) and corresponding improvement of detectors at total energy region up to 10 GeV. This improvement of the experimental conditions may provide valuable physical information from the theoretical point of view. The comparison is made with analogous experimental possibilities of the projected high energy e exp + e exp - storage rings with luminosity up to 10 exp 32 cm exp -2 sec exp -1 . (Atomindex citation 10:435167)

EFI-247(40)-77 PC **A04**/MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Multiparticle Regge Poles as the Pomeron Image.
S. G. Matinyan. 1977, 58p
In Russian.
U.S. Sales Only.

The multiparticle Regge poles occurring in the phi exp 3 theory have been studied. The case of four particles in the t-channel is considered in detail. The results are summarized for the case of an arbitrary number of particles in the t-channel. It is shown that, besides the Mandelstam branching, there are poles formed by multiparticle states in the t-channel. The poles lie to the right of corresponding branchings, and at Ng exp 2 < or approximately 1 (N is the number of particles in the t-channel, g is the connection constant) their intercept depends square upon N. In this region Ng exp 2 trajectories of multiparticle poles are straight. (Atomindex citation 10:468102)

EFI-257(50)-77 PC **A02**/MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Measurement of Total Cross Sections of Hadron Photoproduction on C, Cu, and Pb Nuclei for E/sub gamma /=(12-30) GeV.
E. A. Arakelyan, G. L. Bayatyan, G. S. Vartanyan, N. K. Grigoryan, and S. G. Knyazyan. 1977, 15p
In Russian.
U.S. Sales Only.

The total cross sections of hadron photoproduction on exp 12 C, exp 64 Cu and exp 207 Pb nuclei have been measured for six energies in the (12-30) GeV range. The obtained values of the cross sections for the C and Cu nuclei show weak energy

dependence for high energies (higher than 20 GeV). The cross section on the Pb nuclei somewhat exceeds the expected value and is energy independent. The obtained A dependence of the effective number of hadrons agrees with the vector dominance model predictions. (Atomindex citation 10:468154)

EFI-264(57)-77 MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Analysis of Pion Photoproduction on Nucleons in the Resonance Region.
I. G. Aznauryan, N. Z. Akopov, and A. S. Bagdasarian. 1977, 31p
U.S. Sales Only. Microfiche copies only.

Pion photoproduction on nucleons in the resonance region has been considered. A method of using the dispersion relations is proposed. It permits one to diminish considerably the uncertainly connected with high-energy integrals and to reduce the number of additional unknown parameters. The method was used for the analysis of gamma p implies pi exp 0 p reaction from the threshold up to 1.2 GeV. (Atomindex citation 10:468018)

EFI-272(65)-77 PC **A02**/MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Event of Two-Jet Production of Particles Observed in Nuclear Photoemulsion.
N. A. Marutyan, K. A. Matevosyan, V. M. Krishchyan, F. A. Avetyan, and L. G. Sarkisova. 1977, 12p
U.S. Sales Only.

The (2+0+21) p type interaction with evidently expressed two-jet production of relativistic particles is observed in nuclear photoemulsion exposed to 200 GeV proton beam. Various interpretations of this event are considered. The event microphotography image shows clearly the consequences of hard hadron-hadron collisions when the interaction between the quarks of colliding hadrons resulted in a jet (6-particle) production under large angle with respect to the primary particle direction with a total transverse momentum of approximately 3 GeV/c. (Atomindex citation 10:468199)

EFI-274(67)-77 MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Hadron-Nuclear Collisions for Asymptotically High Energies in the Complex Momenta Theory with alpha /sub p/ sub 0 > 1.
L. A. Grigoryan, and V. A. Shakhbazyan. 1977, 17p
U.S. Sales Only. Microfiche copies only.

Investigations into hadron-nucleus collisions for high energies were carried out. The complex momenta theory with the coupling constant alpha / sub p/ exp 0 > 1 was used. The asymptotical equality of hadron-hadron and hadron-nuclear total cross sections in the eikonal approximation of the theory has been shown. The asymptotical cross section was governed by nonenhanced diagrams, whereas the contribution of enhanced diagrams tended to zero. (Atomindex citation 10:468072)

EFI-314(39)-78 MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Polarization Effects in the E exp + E exp - Implies V + X Inclusive Process in the Parton Model.
G. N. Khachatryan, and Yu. G. Shakhnazaryan. 1978, 20p
U.S. Sales Only. Microfiche copies only.

On the basis of the covariant parton model, the e exp + e exp - implies V + X inclusive process is considered in the case when the summation over the polarizations of the vector meson is not performed. The behavior of all eight structure functions describing such a process was found in the Bjorken scaling limit under the assumption of 0-spin and 1/2-spin partons. Some consequences of the obtained behavior of structure functions were discussed. (Atomindex citation 10:468093)

EFI-319(44)-78 PC **A02**/MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Contribution of New Vector States with (1-2) GeV/C exp 2 Masses to the sigma/sub T/ (Gamma p) Total Photoabsorption Cross Section.
G. L. Bayatyan, S. G. Knyazyan, and A. T. Margaryan. 1978, 10p
In Russian.
U.S. Sales Only.

Calculation of the sigma/sub t/ (gamma p) total cross section within the framework of the vector-meson dominance model has been carried out. It is shown that, with provision for new vector states with (1-2) GeV/c exp 2 masses, as well as rho, omega , phi and J/psi particles, the observed total photoabsorption cross sections can be explained with approximately 2% accuracy. Measuring sigma/sub t/(gamma p) in the E/sub gamma / = (2 to 20) GeV range with the accuracy of <= 1% cn provide the additional information on new vector states. (Atomindex citation 10:468165)

EFI-322(47)-78 PC **A02**/MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
A Dependence in the Process of Dilepton Production by High-Energy Nucleons.
S. R. Gevorkyan, and V. M. Zhamkochyan. 1978, 11p
U.S. Sales Only.

The process of lepton pair production in nucleon-nucleus collisions at high energies is considered. It is shown that with due regard for the N implies pi implies mu exp + mu exp - inelastic transitions the experimentally observed A dependence of the cross section of the NA implies mu exp + mu exp - X process can be explained in the framework of the multiple scattering theory. (Atomindex citation 10:468063)

EFI-323(48)-78 PC **A03**/MF **A01**
Erevanskii Fizicheskii Inst. (USSR).
Inclusive Processes on Nuclei at High Energies.
S. R. Gevorkyan. 1978, 31p
In Russian.
U.S. Sales Only.

Multiple production of particles on nuclei has been investigated. Two principal approaches of treating the inclusive processes on nuclei were considered in the framework of multiple scattering theory and of the regge-parton picture. Calculations for inclusive spectra, multiplicities and coefficients of inelasticity are presented. (Atomindex citation 10:468062)

FRNC-TH-707 PC **A07**/MF **A01**
Paris-11 Univ., Orsay (France).
Spectrometry of Doubly Charged Particles, Applied to Intermediate Energy Physics.
Jean Oostens. 1977, 95p
In French.These (D. es S.).
U.S. Sales Only.

The detection of exp 3 He and exp 4 He at GeV energies is obtained using both magnetic analysis and time-of-flight methods, and several independent measurements of the specific ionization. This technique was applied to the extrapolation of the neutral resonance spectrum in the p + d /yields/ exp 3 He x X reaction and to the p- exp 4 He elastic scattering using incident /alpha/ particles on a hydrogen target. In the first reaction, the data show the production of /pi/ exp 0 , eta exp 0 , /omega/ exp 0 and eta' (957). An explanation implying a proton exchange diagram reveals the importance of the exp 3 He form factor. In the exp 4 He-p reaction, the exp 4 He scattered are detected in a magnetic spectrometer. It is possible to extract the elastic peaks from the continuum background corresponding to the empty target up to about 180 exp 0 (cm). This phenomenon is qualitatively reproduced by triton exchange models. The results obtained are compared to theoretical a model based on the multiple scattering phenomenon. But the interpreting of the experiments presented imply the knowledge of the wave function of both helium isotopes at momenta that have not been reached through electron scattering measurements up to now. (Atomindex citation 10:433888)

IAE-2903 PC **A04**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Moessbauer Fransitions Excited in Neutron Radiative Capture Reactions.
Yu. L. Dobrynin, L. A. Mikaehlyan, and M. Zh. Shmatikov. 1977, 54p
In Russian.
U.S. Sales Only.

The Moessbauer transitions excited in neutron radiative capture reactions, i.e. in the reactions (eta, gamma) and (eta, gamma ; beta), which can be used for the Moessbauer spectroscopy, are considered. Nuclides satisfying the following conditions are selected: the transition energy does not exceed 150 keV; the life time of the level into which the transition takes place is not less than 10 exp 7 years; the life time of the parent nucleus, i.e. nucleus irradiated by neutrons is not less than 10 exp 7 years. The data on the level structure are mainly taken from Nuclear Data Sheets compilations. The work is devided into three parts: 1)transitions, excited in the (eta, gamma) reactions; 2)transitions, excited in the (eta, gamma) reactions followed by the beta exp - or beta exp + decay (one parent nucleus); 3)transitions, excited in the (eta, gamma) reactions followed by the beta exp - and beta exp + decay (two parent nuclei). (Atomindex citation 10:493190)

IAE-2997 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Study of the Hard beta Radiation Produced in Californium-252 Fission.
A. A. Borovoi, Yu. V. Klimov, V. I. Kopeikin, and K. D. Shkol'nik. 1978, 8p
In Russian.
U.S. Sales Only.

The hard beta spectrum (Esub(beta) > 10 MeV) of the exp 252 Cf fission products has been investigated. The measurements were performed in an underground laboratory with a spectrometer with detectors from scintillating plastic. Corresponding calibration curves are presented. The dependence of an upper limit of the electron number Nsub(beta) on the energy has been obtained. The Nsub(beta) values at Esub(beta) > 15 MeV have occurred to be as less at 20 times than those obtained earlier, the investigated energy range having been extended to Esub(beta) > 20 MeV, where Nsub(beta)=2x10 exp -8 beta /fission. Using the results limitations on the yields of some light nuclei in the fission are placed. (Atomindex citation 10:493374)

IC-77-32 PC **A02**/MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Quantization of Scalar-Spinor Instanton.
H. Inagaki. Apr 77, 17p
U.S. Sales Only.

A systematic quantization to the scalar-spinor instanton is given in a canonical formalism of Euclidean space. A basic idea is in the repair of the symmetries of the 0(5) covariant system in the presence of the instanton. The quantization of the fermion is carried through in such a way that the fermion number should be conserved. Our quantization enables us to get well-defined propagators for both the scalar and the fermion, which are free from unphysical poles. (Atomindex citation 10:434169)

IC-77-35 PC **A03**/MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Extended Monopoles in Gauge Field Theories.
Z. Horvath, and L. Palla. Apr 77, 38p
U.S. Sales Only.

The paper gives a review of the 't Hooft monopole and briefly discusses the general topological considerations connected with monopoles. A method is presented for constructing explicit monopole solutions in any gauge theory. Some stability questions and time-dependent problems are also considered. (Atomindex citation 10:434163)

IC-77-37 MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Relativistic Two-Fermion Equations with Form Factors and Anomalous Magnetic Moment Interactions.
S. Ahmed. Apr 77, 18p

U.S. Sales Only. Microfiche copies only.

Relativistic equations for two-fermion systems are derived from quantum field theory taking into account the form factors of the particles. When the q exp 2 dependence of the form factors is disregarded, in the static approximation, the two-fermion equations with Coulomb and anomalous magnetic moment interactions are obtained. Separating the angular variables, a sixteen-component relativistic radial equation are finally given. (Atomindex citation 10:434047)

IC-77-41 MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Non-Linear Realizations and Higgs Mechanism for Extended Supersymmetry.
N. S. Baaklini. May 77, 13p
U.S. Sales Only. Microfiche copies only.

The paper concerns the study of the non-linear realizations and the Higgs mechanism for an extended supersymmetry whose algebra contains both spin 1/2 and spin 3/2 generators besides those of the Poincare subalgebra. (Atomindex citation 10:434061)

IC-77-46 MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Null Surface Quantization and Quantum Field Theory in Asymptotically Flat Space-Time.
V. P. Frolov. May 77, 79p
U.S. Sales Only. Microfiche copies only.

A quantum theory of the free scalar, electromagnetic and gravitational fields in a curved symptotically flat space-time is developed. It is shown that the Penrose conformal technique makes it possible to reformulate the null infinity quantization as a problem of the quantization on the proper null surface in the corresponding Penrose space. The Schwinger dynamical principle is exploited to derive the corresponding null surface commutation relations. The general covariant and gauge-independent form of the commutation relations is also given. The existence of the asymptotic symmetry (BMS) group on the asymptotically flat space-time is used to define uniquely the "in" and "out" vacuum states. The explicit expressions for the S-matrix operator and for the S-matrix elements in the asymptotically simple space-time are given. The functional integration method is used to find the expression for the density matrix describing the observations at I exp + in the weakly asymptotically simple space-time when the information loss due to the event horizons or the existence of bare singularities is possible. The application of the developed approach to the problem of quantum evaporation of black holes (Hawking effect) is briefly discussed. (Atomindex citation 10:434137)

IC-77-51 MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Method of Boson Expansions in Quantum Theory.
P. Garbaczewski. Jun 77, 111p
U.S. Sales Only. Microfiche copies only.

A review is presented of boson expansion methods applied in quantum theory, e.g. expansions of spin, bifermion and fermion operators in cases of finite and infinite number of degrees of freedom. The basic purpose of the paper is to formulate the most general criterion allowing one to obtain the so-called finite spin approximation of any given Bose field theory and the class of fermion theories associated with it. On the other hand, we also need to be able to reconstruct the primary Bose field theory, when any finite spin or Fermi systems are given. (Atomindex citation 10:434142)

IC-77-63 MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Classical Solutions in Two-Dimensional Supersymmetric Field Theories.
P. Di Vecchia, and S. Ferrara. Jul 77, 18p
U.S. Sales Only. Microfiche copies only.

Classical solutions of some supersymmetric field theories in two-dimensions are investigated. These solutions are constructed solving first-order differential equations in superspace, which are the supersymmetric extension of the analogous equations used in the purely bosonic sector. (Atomindex citation 10:434114)

IC-77-64 PC **A02**/MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Genesis of Unified Models from Majorana-Weyl Fields.
P. Budini, and P. Furlan. Jul 77, 23p
U.S. Sales Only.

It is proposed that all forms of interaction arise from elementary interactions between Weyl-Majorana fields. Weak interactions due to the high masses of the intermediate bosons are practically identical to the elementary interactions. Strong and electromagnetic interactions arise at larger distance, where dynamic determines both masses and symmetry. In the frame of these ideas, Pati-Salam and Fritzsch-Minkowski type of unified models are constructed starting from eight Weyl-Majorana fields. Fractional charges for quarks, integer charges for lepton and regularization of q.e.d. arise naturally from the model. Unobserved transitions (mu implies e + gamma , p implies leptons) may be ascribed to properties of the elementary fields (handedness) rather than very high W masses. (Atomindex citation 10:434081)

IFUSP-P-105 PC **A02**/MF **A01**
Sao Paulo Univ. (Brazil). Inst. de Fisica.
Can the Effective Potential Determine Whether a Given Theory Exhibits Confinement.
H. Fleming, and I. Ventura. Dec 76, 12p
U.S. Sales Only.

When dealing with a quantum field theory, an inspection of the logarithmic terms of its effective potential may decide whether it exhibits (or not) confinement. Inspiring ourselves on classical field theory we are able to establish rules of confinement. These rules are then applied, with success, in various models whose effective potentials we know (in the one loop approximation). (Atomindex citation 10:431198)

IFUSP-P-116 PC **A02**/MF **A01**
Sao Paulo Univ. (Brazil). Inst. de Fisica.
Kinematical Constraints and Dynamical Assumptions.
R. Nulman, and E. Predazzi. 8p
U.S. Sales Only.

It is shown how the energy-momentum correlation sum rules lead to the inconsistency of a class of uncorrelated jet models. This is an amusing example of how dynamical models can be rejected as violating kinematical constraints. (Atomindex citation 10:431781)

IFUSP-P-122 PC **A03**/MF **A01**
Sao Paulo Univ. (Brazil). Inst. de Fisica.
Some Aspects of the Classical Motion of Extended Charges.
H. M. Franca, G. C. Marques, and A. J. da Silva. Jul 77, 30p
U.S. Sales Only.

Starting from a covariant equation, we have shown how a consistent equation of motion and an equation for the energy balance are achieved in the nonrelativistic limit. In that limit we can integrate such an equation for any charge distribution by finding its Green's function. Conclusions concerning to the existence of unphysical solutions (and explicit solutions for a large class of models) can be drawn from an analysis of the location of the poles of the Green's function. A new condition for the nonexistence of pathologicla solutions is discussed. (Atomindex citation 10:431201)

IFUSP-P-123 PC **A03**/MF **A01**
Sao Paulo Univ. (Brazil). Inst. de Fisica.
Effective Potentials in Gauge Field Theories.
P. S. S. Caldas, H. Fleming, and R. L. Garcia. 29p
U.S. Sales Only.

An elementary and very efficient method for computing the effective potential of any theory containing scalar bosons is described. Examples include massless scalar electrodynamics and Yang-Mills theories. (Atomindex citation 10:431179)

IFUSP-P-124 PC **A02**/MF **A01**
Sao Paulo Univ. (Brazil). Inst. de Fisica.
Gauge Invariant Subtraction Scheme for Massive Quantum Electrodynamics.
E. Abdalla, M. Gomes, and R. Koeberle. 14p
U.S. Sales Only.

A momentum-space subtraction scheme for massive quantum electrodynamics is proposed which respects gauge invariance, in contrast to ordinary normal product techniques. As a consequence the dependence of Green functions on the ghost mass becomes very simple and formally gauge invariant normal products of degree up to four, when subtracted according to the proposed scheme, are automatically gauge invariant. As an aplication we discuss the proof of the Adler-Bardeen theorem. Zero mass limits can be taken for Green function after the integration over intermediate states has been carried out. (Atomindex citation 10:481160)

IFUSP-P-127 PC **A02**/MF **A01**
Sao Paulo Univ. (Brazil). Inst. de Fisica.
Exponentiation of Leading Infrared Divergences in Massless Yang-Mills Theories.
J. Frenkel, and R. L. Garcia. 1977, 7p
U.S. Sales Only.

We derive, in the axial gauge, the effective U-matrix which governs the behaviour of leading infrared singularities in the self-energy functions of Yang-Mills particles. We then show in a very simple manner, that these divergences, which determine the leading singularities in massless Yang-Mills theories, exponentiate. (Atomindex citation 10:431202)

IFUSP-P-137 PC **A02**/MF **A01**
Sao Paulo Univ. (Brazil). Inst. de Fisica.
Connection Between Elastic Relativistic Form Factors and Charge Distribution.
H. P. Franca, G. C. Marques, and A. J. da Silva. Jan 78, 8p
U.S. Sales Only.

A scheme by means of which one can establish the connection between form factors and charge distribution (for particles of any spin) in proposed. Except for the nonrelativistic domain our results differ from previous ones. Consequences of our relations (some of them in agreement with experimental and previous theoretical results) are briefly discussed. (Atomindex citation 10:431745)

IFUSP-P-141 PC **A02**/MF **A01**
Sao Paulo Univ. (Brazil). Inst. de Fisica.
Renormalization-Invariant Masses.
H. Fleming, and K. Furuya. Feb 78, 8p
U.S. Sales Only.

It is shown that spontaneous generation of renormalization invariant mass is possible in infra-red stable theories with more than one coupling constant. If relations among the coupling constants are permitted the effect can be made compatible with pertubation theory. (Atomindex citation 10:431195)

IFUSP-P-143 PC **A02**/MF **A01**
Sao Paulo Univ. (Brazil). Inst. de Fisica.
Equivalence of Massive Qed with Renormalizable and in Unitary Gauge.
E. Abdalla. Mar 78, 15p
U.S. Sales Only.

In the framework of BPHZ renormalization procedure, we discuss the equivalence between 4-dimensional renormalizable massive quantum electrodynamics (Stueckelberg lagrangian), and massive QED in the unitary gauge. (Atomindex citation 10:431159)

IFUSP-P-144 PC **A02**/MF **A01**
Sao Paulo Univ. (Brazil). Inst. de Fisica.
Self-Consistent Computation of Spontaneously Generated Mass.
H. Fleming. 6p
U.S. Sales Only.

Recent results on mass generation in the Gross-Neveu model obtained by the use of self-consistent methods are analysed through renormalization-group methods. The invariance of the mass under a class of renormalizations introduced by T.Muta is proved. (Atomindex citation 10:431197)

IFUSP-P-153 PC **A02**/MF **A01**
Sao Paulo Univ. (Brazil). Inst. de Fisica.
Mass in the Gross-Neveu Model.
H. Fleming, and K. Furuya. Aug 78, 20p
U.S. Sales Only.

A reinterpretation of the Nambu - Jona - Lasinio self-consistent technique allows, in the Gross-Neveu model, for interpreting some recent works on the spontaneous mass generation in a unified way and also for the extension of the computations to a higher order. (Atomindex citation 10:431196)

IFUSP-P-77 MF **A01**
Sao Paulo Univ. (Brazil). Inst. de Fisica.
Fluctuation Cross-Section in the Case of an Isolated Doorway Resonance.
M. S. Hussein. 16p
U.S. Sales Only. Microfiche copies only.

Some aspects of the fluctuation part of the cross section at a doorway resonance are discussed. We show that in the strong absorption (SA) limit an inequality is derived. In the SA limit no doorway resonance appears in the average cross section. (Atomindex citation 10:431753)

IFVE-M-15 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Integral Correlations Between Neutral and Negative Pions in Pp-Interactions at 69 GeV/C.
V. V. Ammosov, V. A. Gapienko, and M. Boratav. 1975, 10p
In Russian.
U.S. Sales Only.

The paper presents results of handling the pictures from Mirabelle chamber. About 2000 conversion pairs produced in pp-interaction at 69 GeV/c have been processed. The dependence of the average number of pi exp 0 mesons <n sub 0 > on negative particle multiplicity has been obtained and the correlation parameter f sub 200 has been determined. The dependence of <P sub(L)sup*> and <P sub(T) > photons on charged particle multiplicity has been found. The obtained results are compared with the theoretical predictions. (Atomindex citation 10:428565)

IFVE-M-26 MF **A01**
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij.
Pi Sup(+-) Meson and Proton Production in Inclusive and Semi-Inclusive Processes in Pp Interactions at 69 GeV/C. Part 2.
V. V. Ammosov, V. V. Babintsev, P. F. Ermolov, E. V. Vlasov, and B. G. Klimenko. 1976, 26p
In Russian.
U.S. Sales Only. Microfiche copies only.

The new data on inclusive pi exp - , pi exp + meson and proton production in pp- interactions at 69 GeV/c are given. The invariant differential cross sections f(x), f(y) and g(psub(T) exp 2) are investigated; the rate of f(y) approach to the limit values in fragmentation and central regions is defined from comparison with the data at lower energies. The pi exp - , pi exp + and p spectra are also investigated in semi-inclusive reactions, and KNO-11 scaling hypothesis applicability to them is considered. (Atomindex citation 09:416157)

IFVE-OTF-OPK-77-107 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Symmetry Violation and Quark Distributions in Mesons.
P. V. Chliapnikov, V. V. Kniazev, A. K. Likhoded, and V. G. Kartvelishvili. 1977, 22p
U.S. Sales Only.

The valence quark distributions in the strange and charmed particles are determined by introducing the different Regge trajectories for different quark flavours in order to take into account the strong SU(3) and SU(4) symmetry breaking. The valence quark distributions in pi , K and D mesons are shown to be quite different. The K meson valence quark distributions and the quark fusion mechanism of particle production have been used to calculate the inclusive spectra of vector mesons in K exp + p interactions at 32 GeV/c which are found to be in a good agreement with experimental data. (Atomindex citation 09:406162)

IFVE-OTF-PPK-75-110 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Nature of Weak Hadronic Current.
G. G. Volkov, A. G. Liparteliani, and F. F. Tikhonin. 1975, 7p
In Russian.
U.S. Sales Only.

The form of weak both charged and neutral hadronic currents has been obtained in the framework of SU(4) symmetry with account of the experimental situation. The obtained form for charmed particles is considerably different from the one assumed earlier. A brief discussion of the main experimental consequences is presented. The analysis results change the earlier assumed picture of weak production of charmed particles and their decays. It turns out that usual charmed particles should be produced with approximately the same intensity as strange charmed particles. It became possible to analyse weak nonleptonic interactions on the basis of 15- dominance. (Atomindex citation 10:431800)

IFVE-OTF-75-103 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Structure of Weak Hadron Currents.
G. G. Volkov, A. G. Liparteliani, and F. F. Tikhonin. 1975, 7p
In Russian.
U.S. Sales Only.

Two kinds of the charged and neutral weak hadron currents are obtained and investigated within the framework of the SU(4) theory. (Atomindex citation 10:431799)

IFVE-OTF-75-132 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Possible Unified Scheme for Weak and Electromagnetic Interactions in the Framework of the SU(2)XU(1) Symmetry.
G. G. Volkov, and A. G. Liparteliani. 1975, 10p
In Russian.
U.S. Sales Only.

A united Lagrangian for weak and electromagnetic interaction, based on the second obtained solution for charged currents, whose form differs from GlMsup(71,2/) scheme has constructed in the framework of SU(2)xU(1) symmetry. Experimental consequences of this scheme are discussed for neutral neutrino-nucleon collisions. (Atomindex citation 10:431802)

IFVE-OTF-75-24 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Description of Growing Cross Sections by Means of Reaction Generalized Matrix.
S. V. Semenov, S. M. Troshin, N. E. Tyurin, and O. A. Khrustalev. 1975, 12p
In Russian.
U.S. Sales Only.

The paper presents a description of the growing total cross sections of pp, pi sup(+-)p, Ksup(+-)p interactions with the help of reaction generalized matrix. There is also given a simultaneous description of the total cross section and slope parameter of diffraction cone for pp-scattering. (Atomindex citation 10:431786)

IFVE-OTF-75-59 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Triple Reggeon Analysis of Proton Inclusive Spectra with Zero(At T=0) Triple-Pomeron Coupling.
L. G. Dakhno. 1975, 17p
U.S. Sales Only.

The analysis of the inclusive proton spectra in the triple reggeon limit is presented for the reaction p+p implies p+X. All available experimental data in the energy range s=45/930 GeV exp 2 is satisfactorily described by a series of Regge poles with triple-pomeron coupling tending to zero at t=0. (Atomindex citation 09:406165)

IFVE-OTF-75-88 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Energy Scale in Inclusive Spectra.
A. K. Likhoded, and A. N. Tolstenkov. 1975, 14p
In Russian.
U.S. Sales Only.

On the basis of the model, valid in some limited domain of phase space it is shown that a universal dependence of inclusive spectra not connected with the type of initial and detected particle takes place. The whole dependence upon the quantum number of the reaction enters the scale factor for total energy. The given experimental data are in favour of the fact that scale factor is universal in the whole domain of variable changes, and its value is connected with the spectrum behaviour in the central region. (Atomindex citation 10:431769)

IFVE-OTF-75-96 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Some Consequences of the SU(8) Symmetry for Mesons.
V. V. Khrushchev. 1975, 7p
In Russian.
U.S. Sales Only.

SU(8) group, that joins SU(4) and SU(2)sub(spin) is considered as a widened symmetry group for hadrons. The mass ratio for the terms of regular representation SU(8) to which pseudoscalar and vector mesons belong has been obtained. Proceeding from these ratios possible masses for D, F, Dsup*, Fsup* mesons have been calculated. (Atomindex citation 10:431760)

IFVE-OTF-77-61 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Finite Solutions of Classical Yang-Mills Equations.
A. N. Leznov, and M. V. Saveliev. 1977, 19p
U.S. Sales Only.

An explicit form of nonsingular solutions for the configuration of two pseudoparticles (instantons) for SU-2 gauge theory in the Euclidean space is presented. The solutions derived correspond to the topological charge with value of two. They contain thirteen independent parameters. Though the obtained solution depends on the required number (=13) of the independent parameters and satisfies the finiteness conditions. Its physical sense is not clear yet. (Atomindex citation 10:434192)

IFVE-OTF-78-5 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Analytical Properties of Single Particle Inclusive Cross Section in Scattering Angle in a Class of Ladder Models with Dynamic Symmetry.
V. Yu. D'yakonov, V. E. Rochev, and S. N. Storzhak. 1978, 20p
In Russian.
U.S. Sales Only.

Analytical properties of single particle inclusive cross section in cos THETA variable (THETA is a scattering angle in the center-of-mass system) for ladder models with dynamic symmetry O(4,1) are investigated. The analyticity region is a whole plane excluding the cuts on real axis. The positions of nearest to the origin singularities are in agreement with hypothesis proposed in a previous paper. The hypothesis assumes, that single particle inclusive distribution function has an analyticity ellipse in cos THETA with a long semi-axis. It is pointed out that such an analyticity region is not connected with the dynamic symmetry of the models considered. (Atomindex citation 10:431184)

IFVE-PEF-OTF-75-104 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Diffraction Processes in Neutrino Experiments.
S. S. Gershtein, L. A. Klimenko, and V. N. Folomeshkin. 1975, 12p
In Russian.
U.S. Sales Only.

The problem of the behaviour of cross section for vector meson production with mass of about 2 GeV (e.g. Vector Fsup*-meson) in neutrino-nucleon collisions has been considered in the vector dominance model. The value of the cross section is shown to depend on the value of the slope parameter for the cross section of the process nu N implies nu + hadrons. A possibility to explain distributions in hadron mass in antineutrino beam in FNAL experiments due to production of usual (not charmed) vector hadron states has been considered in the spirit of generalized vector dominance. (Atomindex citation 10:431748)

IFVE-PEF-75-86 MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Boson States in the Reaction pi exp - p implies pi exp - pi exp - pi exp + p with Leading pi exp + Meson at 25 GeV/C.
Yu. M. Antipov, G. Ascoli, and R. Baud. 1975, 16p
U.S. Sales Only. Microfiche copies only.

The reaction pi exp - + p implies p + pi exp - + pi exp - + pi exp + at 25 GeV/c was studied in the mass region M sub(3 pi) > > = 1.8 GeV with leading pi exp + in the final state. The mass spectrum of pi exp 1 pi exp - -system evidently shows peaks rho deg, f, g deg resonances and an enhancement in S'-region. It is shown that the g deg and pi exp - mesons are mainly in A4 state J sub(P) = 3 exp + S-wave g deg pi exp - like A1(sup(rho pi)) and A3(sup. (Atomindex citation 10:428568)

IFVE-PEF-76-6 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Elastic pi exp + p, K exp + p and Pp Scattering in the Region of Coulomb-Nuclear Interference at 42.5 and 52.2 GeV/C.
V. D. Apokin, A. N. Vasil'ev, A. A. Derevshchikov, Yu. A. Matulenko, and A. P. Meshchanin. 1976, 20p
In Russian.
U.S. Sales Only.

Differential cross sections of elastic scattering of positive pions, kaons and protons on protons and also total cross sections at initial momenta 42.5 and 52.2 GeV/c are measured. Values of four momentum transfer squared were in the limits of (10 exp -3 -5x10 exp -2) (GeV/c) exp 2 . Values of rho(0)-ratio of the real part of the forward scattering elastic amplitude relations to the imaginary one are defined from the experimental data. The comparison of the obtained results with the dispersion relations is given. (Atomindex citation 09:406266)

IFVE-PPK-75-149 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Energy Dependence of pi exp + / pi exp - Ratio in Pp-Collisions in the Three-Component Shower Model and the Analysis of Multiple Production Data.
Yu. I. Arestov. 1975, 18p
In Russian.
U.S. Sales Only.

It is proved in the frame of the three-component model with showers for multiple production of particles that the ratio of the average number of pi exp + -mesons to the average number of pi exp - -mesons in pp-collisions is expressed by the formula pi exp + / pi exp - = 1 + 0(a exp -1), where a is a model parameter depending on ln s. The estimations of the average numbers of p, n, lambda deg, sigma are given in the energy interval from 70 to 300 GeV/c. The values of differences pi exp + - pi exp - and pi deg - pi exp - are found to be constant and equal to 0.67 and 0.48, respectively. (Atomindex citation 09:406152)

IFVE-PPK-75-31 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
KNO-Scaling, Moments and Correlation Parameters in the Three Component Model of Multiplicity Distribution in Pp-Collisions.
Yu. I. Arestov. 1975, 15p
In Russian.
U.S. Sales Only.

The proposed three-component multiplicity distribution over m negative particles in pp-collisions is based on the multi-Reggeon analyses of ladder diagrams and posesses the properties of KNO-scaling. The moments relate as <msup(q)> / <m>sup(q) = Csub(g) + 0(<m> exp -1). The theoretical values for the correlation parameters f sub 2 , f sub 3 , f sub 4 are calculated and compared with the experimental ones at the energies from 70 up to 405 GeV/c. The cross-section of threeshower processes at 405 GeV/c is estimated as 2,5 mb. (Atomindex citation 09:406151)

IFVE-PPK-75-90 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
SU(4)-Scheme of Weak Interactions and Leptonic Decays of Baryons.
G. G. Volkov, and A. G. Liparteliani. 1975, 7p
In Russian.
U.S. Sales Only.

The SU(4)-scheme of weak interactions is considered. Possible leptonic decays of baryons 20/1/2 exp + / are considered based on this scheme. (Atomindex citation 10:431801)

IFVE-40-76 MF **A01**
Akademiya Nauk Kazakhskoi SSR, Alma-Ata. Inst. Fiziki Vysokikh Energii.
Three-Body Problem in the Coupling Constant Differential Method.
N. Zh. Takibaev. 1976, 17p
In Russian.
U.S. Sales Only. Microfiche copies only.

The coupling constant differential method based on the evolution of the system with the change of the coupling constant from zero to q real value is considered. The method gives the scattering matrix, which is unitary at each stage of the successive approximation procedure. Main equations are obtained, which are applied for investigating into the two-and three-body problem. In the two-body problem expressions are obtained for the scattering phase and binding state energy, which are used then for describing the neutron elastic scattering on deuterons. In so doing, the interaction potential of two nucleons is chosen in the form of the Yamaguchi separable potential. In the three-body problem the neutron quartet scattering phases on deuteron and the length of the S-wave scattering are calculated in the lowest approximation with respect to a small parameter. The results are in good agreement with experimental values. The convergence of the iteration series is considered and it is shown that the contribution of the following terms of the series equals approximately 10%. The advantages of the described procedure over the method based on the Faddeev equations and others are pointed out. (Atomindex citation 10:434252)

INDC(CCP)-132/LV PC **A04**/MF **A01**
International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee.
Determination of the Errors in Evaluated Data with Allowance for Correlations. Evaluation of sigma/sub F/(Exp 235 U), alpha (Exp 235 U), alpha (Exp 239 Pu) and sigma/sub F/(Exp 239 Pu) for the Evaluated Nuclear Data Library BOYaD-3.
V. A. Kon'shin, E. Sh. Sukhovitskii, and V. F. Zharkov. Apr 79, 57p
U.S. Sales Only.

The authors have developed a method of evaluating data and the errors in them with allowance for correlations between the partial errors of different experiments. This method has been used to evaluate the values of sigma/sub f/(exp 235 U), alpha (exp 235 U) and alpha (exp 239 Pu) needed for establishing an evaluated nuclear data library. (Atomindex citation 10:468512)

INDC(NDS)-100/M PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee.
IAEA Advisory Group Meeting on Nuclear Data for Reactor Dosimetry, Vienna, 13 - 17 November 1978. Summary Report.
A. Lorenz. Jan 79, 25p
U.S. Sales Only.

This Advisory Group Meeting on Nuclear Data for Reactor Dosimetry was convened by the IAEA Nuclear Data Section, at IAEA Headquarters in Vienna, Austria, from 13-17 November 1978. The meeting was attended by 20 representatives from 10 Member States and 2 international organizations. The primary objective of this meeting was to finalize the details for the creation of a new international file of evaluated neutron cross section data for reactor dosimetry applications, and to establish a procedure for the testing and adjustment of these data. (Atomindex citation 10:481579)

INP-930/PH PC **A02**/MF **A01**
Institute of Physics and Nuclear Techniques, Krakow (Poland).
Correlations in Hadron-Nucleus Collisions.
B. Wosiek. Sep 76, 25p
U.S. Sales Only.

The correlations between the particles produced in interactions of hadrons with emulsion nuclei were investigated. The data are in qualitative agreement with the models which describe the interactions with nuclei as subsequent collisions of the fast part of excited hadronic matter inside the nucleus. (Atomindex citation 10:428559)

IPNO-PhN-78-12 PC **A03**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Properties of exp 192 Pb- exp 190 Pb; Behavior of the Very Neutron Deficient Even Lead Isotopes.
C. Roulet, G. Albouy, G. Auger, J. M. Lagrange, and M. Pautrat. 1978, 39p
U.S. Sales Only.

The two very neutron-deficient isotopes of lead, A = 190, 192, have been produced and studied through the reaction exp 156 Gd- exp 154 Gd(exp 40 Ar,4n gamma) exp 192 Pb- exp 190 Pb. The identification of those nuclei was also studied by means of the two additional reactions: exp 182 W(exp 16 O,6n gamma) exp 192 Pb and exp 156 Gd(exp 40 Ar,6n gamma) exp 190 Pb. The pulsed exp 40 Ar beam available at ALICE (Orsay) enabled recording of singles gamma spectra as well as four-dimensional (energy-time) spectra corresponding to the correlation of two Ge(Li) detectors for different time windows. Tentative level-schemes are proposed. No significant deviation from the behavior previously reported for the heavier isotopes is pointed out. The data are consistently reproduced within a 2 q.p formalism by use of an S.D.I. residual interaction. However, a slow decrease of the 2 sub 1 + level energy is observed which could be an indication of a weakly increasing collective trend when the number of neutron holes increases. Those experimental conclusions fairly agree with the theoretical predictions by F.Dickman and K.Dietrich. As a matter of fact, the authors predict a spherical shape for the ground states and find a secondary prolate minimum of the deformation potential at low energy. But the latter is not well developed for A > 184, a spherical behavior for the heavier isotopes is suggested. (Atomindex citation 10:481591)

IPNO-PhN-78-19 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Study of exp 188 Pt with the exp 190 Pt(P,T) exp 188 Pt Reaction.
M. Vergnes, G. Rotbard, J. Kalifa, G. Berrier, and J. Vernotte. 1978, 7p
U.S. Sales Only.

The exp 190 Pt(p,t) exp 188 Pt reaction has been studied at 25 MeV on an enriched target (35%). The g.s. implies g.s. intensity does not differ -within error limits- from such intensities observed for the other even Pt isotopes, and the low-lying 0 exp + level is weakly excited (5%) as compared to the ground state. There is therefore no indication for an important shape transition between 190 and 188. (Atomindex citation 10:481607)

IPNO-PhN-78-25 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
New Experimental Results Supporting the Hypothesis of the Excitation of Collective Modes in the exp 40 Ca+ exp 40 Ca Reaction.
H. Tricoire, P. Colombani, C. Gerschel, N. Perrin, and L. Valentin. 1978, 12p
U.S. Sales Only.

Steps in the gamma -ray multiplicity as function of the excitation energy have been observed in coincidence with the incompletely relaxed part of the energy spectra of fragments emitted in the reaction exp 40 Ca+ exp 40 Ca at 400 MeV. Excitation energies and angular dependence of these variations suggest that they are correlated with the excitation of high energy collective modes through a rather direct process in the early stages of the reaction. l-values of this excitation mode are discussed. (Atomindex citation 10:481604)

IPNO-PhN-78-30 PC **A03**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Exp 71 Ga and exp 73 Ga Levels as Observed in the (T,p) Reaction.
M. N. Vergnes, G. Rotbard, E. R. Flynn, D. L. Hanson, and S. D. Orbesen. 1978, 27p
U.S. Sales Only.

A study of the (t,p) reaction on the two stable Ga isotopes has been performed. The reaction protons were analyzed in a Q3D spectrometer with a resulting energy resolution approximately 18 keV. Levels up to about 3 MeV excitation energy in exp 71 Ga and 2.75 MeV in exp 73 Ga were measured with 11 new levels observed in the first case and 18 in the second. The angular distributions have been compared to pure distributions observed in the exp 72 Ge(t,p) and exp 74 Ge(t,p) reactions at the same energy and found to correspond mostly to pure angular momentum (L) transfer although mixing of L's is allowed. A number of new spin assignments are made for Ga levels, and the results are used to discuss the spin of exp 73 Zn/sub g.s./ . The striking splitting of the L=0 strength in three approximately equal components, observed in exp 73 Ga, strongly supports a transition in nuclear deformation between N=40 and 42. (Atomindex citation 10:481608)

IPNO-TH-78-21 PC **A06**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Sum Rules for Nuclear Collective Excitations.
O. Bohigas, A. M. Lane, and J. Martorel. Jul 78, 125p
U.S. Sales Only.

Characterizations of the response function and of integral properties of the strength function via a moment expansion are discussed. Sum rule expressions for the moments in the RPA are derived. The validity of these sum rules for both density-independent and density-dependent interactions is proved. For forces of the Skyrme type, analytic expressions for the plus-one and plus-three energy-weighted sum rules are given for isoscalar monopole and quadrupole operators. From these, a close relationship between the monopole and quadrupole energies is shown and their dependence on incompressibility and effective mass is studied. The inverse energy-weighted sum rule is computed numerically for the monopole operator, and an upper bound for the width of the monopole resonance is given. Finally the reliability of moments given by the RPA with effective interactions is discussed using simple soluble models for the hamiltonian, and also by comparison with experimental data. (Atomindex citation 10:481469)

IPNO-TH-78-24 PC **A03**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Nuclear Densities from Theory and Experiment.
A. Bouyssy, and X. Campi. Aug 78, 33p
U.S. Sales Only.

Some general properties of the Wigner transform are reviewed. Non-locality expansions of the one-body density matrix are derived in terms of the moments of the Wigner function. The present status of our theoretical and experimental knowledge of the nuclear one-body density is discussed. (Atomindex citation 10:481472)

IPNO-TH-78-50 MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
First Order of the Hyperspherical Harmonic Expansion Method.
M. Fabre de la Ripelle, and J. Navarro. Dec 78, 88p
U.S. Sales Only. Microfiche copies only.

The hyperspherical harmonic expansion method is studied in this work. The attention is focused on the properties of the Lsub(m)-approximation in which only the hyperspherical harmonics of minimal order are taken into account. Exact solutions of the Schroedinger equation for few simple hyperspherical potentials are given. Recipes for constructing antisymmetric hyperspherical harmonics for fermions are investigated, and various procedures to derive the effective potential in the Lsub(m)-approximation are discussed. The method is applied to the calculation of ground state and hyperradial excited states (which are identified to the breathing modes) of doubly-magic nuclei. Finally, the energy per particle is derived in the Lsub(m)-approximation with Skyrme like forces for an infinitely heavy N=Z nucleus. (Atomindex citation 10:493205)

IPNO-TH-79-04 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Study of the Adiabaticity of TDHF Solutions.
P. Bonche, and P. Quentin. 1979, 6p
U.S. Sales Only.

A method for studying the adiabaticity of TDHF solutions (i.e. entracting the Baranger-Veneroni rho sub 0 and chi operators) is shortly reviewed. It is further illustrated in the testing case of small amplitude nuclear vibrations. (Atomindex citation 10:493173)

ISN-78-31 PC **A02**/MF **A01**
Grenoble-1 Univ. (France). Inst. des Sciences Nucleaires.
Measurements of Heavy Ion Radiative Capture Cross Sections.
J. B. Viano, A. J. Cole, N. Longequeue, J. J. Lucas, and J. Menet. Oct 78, 13p
U.S. Sales Only.

Cross sections for the radiative capture and one nucleon emission reactions have been obtained by mass identification of reaction products at 0 exp 0 by using thin targets for the systems exp 12 C+ exp 14 N (70 and 59 MeV), exp 30 Si+ exp 14 N (70 and 59 MeV) and exp 27 Al+ exp 14 N (59 MeV). The cross sections for radiative capture are in all cases <500 nb. The measurement of the exp 30 Si+ exp 14 N cross section is in disagreement with previous work performed using thick targets. This discrepancy is discussed. (Atomindex citation 10:481611)

ISN-78-39 PC **A02**/MF **A01**
Grenoble-1 Univ. (France). Inst. des Sciences Nucleaires.
Investigation of the Neutron-Deficient Isotope exp 123 Ba.
N. Yoshikawa, J. Gizon, and A. Gizon. 1978, 19p
U.S. Sales Only.

High-spin levels in exp 123 Ba have been produced in the exp 114 Sn(exp 12 C,3n) reaction and studied by in-beam gamma -ray spectroscopic techniques. Only one strongly populated band structure has been identified and explained as an odd-parity level system based on a 7/2 exp - state generated by the coupling of an h/sub 11/2/ neutron-hole to a prolate-type triaxial core. Comparisons with heavier odd-A Ba isotopes and N=67 isotones are made. (Atomindex citation 10:481617)

ISN-79-06 PC **A02**/MF **A01**
Grenoble-1 Univ. (France). Inst. des Sciences Nucleaires.
Prospective Study of Giant Resonances by Inelastic Scattering of Heavy Ions and Search for Giant Monopole Resonance by Inelastic Scattering of exp 3 He.
M. Buenerd, D. Lebrun, and P. Martin. 1979, 16p
In French.
U.S. Sales Only.

A set of standard targets exp 40 Ca - exp 90 Zr - exp 208 Pb has been studied by inelastic scattering of 120 MeV exp 12 C, 108 MeV exp 13 C and 160 MeV exp 14 N. Measured spectra show that the Giant Quadrupole Resonance (GQR) and Low Energy Octupole Resonance (LEOR) is excited with a cross section of several mb/sr around the grazing angle. Angular distribution is accounted for by DWBA calculations. Study of exp 90 Zr(exp 3 He, exp 3 He') reaction at very small angles (2 to 5 exp 0) provides evidence for a state 3.2 MeV wide at 16.9 excitation energy which is a good candidate to Jsup(pi)=0 exp + compression mode. (Atomindex citation 10:493377)

ITEF-24(1975) PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
SU Sub 3 XU sub 1 Xu sub 1 ' Gauge Model of Weak and Electromagnetic Interactions.
E. P. Shabalin. 1975, 16p
In Russian.
U.S. Sales Only.

The SU sub 3 x U sub 1 x U sub 1 ' gauge model of weak and electromagnetic interactions satisfying gamma T = 1/2 rule for nonleptonic decays of strange particles is given. The predicted value of neutral currents agrees with the experimental data. (Atomindex citation 10:434237)

ITEP-21(1977) PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Remarks on Electromagnetic Form Factors of Hadrons in the Quark Model.
A. I. Vainshtein, and V. I. Zakharov. 1977, 12p
U.S. Sales Only.

Relations between the transversal and longitudinal parts of elastic and quasielastic form factors are studied within the quark model. It is shown that for an even number of the constituent quarks the longitudinal part dominates while for an odd number the transversal part is the largest one. Consequences form this result are considered for deuteron form factor and for matrix elements of the electromagnetic transitions between pi , rho, A sub 1 mesons. (Atomindex citation 10:435274)

ITEP-52(1975) PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Application of the Method of Integral Equations for Calculating the Vertex Constants for an alpha Particle.
A. G. Baryshnikov, L. D. Blokhintsev, and I. M. Narodetsky. 1975, 42p
U.S. Sales Only.

The vertex constants G/sup alpha TN) sub 2 and G/sup alpha dd) sub 2 characterizing the virtual decays alpha implies t(tau) + p(n) and alpha implies d + d have been calculated by solving the Faddeev -Yakubovsky equations for a system of four nucleons. A spin-dependent separable potential with the Hulthen form factor is used as the NN-interaction. The resonant Hilbert-Schmidt expansion is applied to solve the integral equations. The obtained values G/sup alpha TN) sub 2 = 17.9 +- 1.7 fm and G/sup alpha dd) sub 2 18.1 +- 1.3 fm are compared with empirical data. (Atomindex citation 10:435421)

ITP-76-35-E MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Teoreticheskoi Fiziki.
High-Temperature Phase Transition in Hadron Matter.
A. I. Bugrii, and A. A. Trushevsky. 1976, 32p
U.S. Sales Only. Microfiche copies only.

A possible phase transition in hadronic systems at temperatures of few of GeV is shown in the framework of the S-matrix formulation of statistical mechanics given by Dashen, Ma, Bernstein by using Regge pole model for the scattering amplitude. (Atomindex citation 09:406159)

JAERI-M-7734 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.

Level Schemes for Some Fission Product Nuclides. Comparison of Level Schemes Used by JAERI and Petten.
Z. Matsumoto, T. Murata, and R. Nakasima. Jun 78, 55p
U.S. Sales Only.

Level schemes of 24 fission product nuclides are compared between JAERI and Petten data collections. When the assignments of spin and parity are different, the reasons for JAERI's are described. In typical cases are the cross section of inelastic scattering and (n, gamma) reaction calculated using the JAERI's and Petten's level schemes are compared. The distribution of the low-lying levels of which spins and parities are assigned is also presented. (Atomindex citation 10:468524)

JAERI-M-7758 MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Map of Calculated Radioactivity of Fission Product, (4). Overall Radioactivity of Fission Products for 18 Different Neutron Fluxes.
T. Takeda. Jul 78, 235p
In Japanese.
U.S. Sales Only. Microfiche copies only.

The overall radioactivities of fission products as a function of irradiation time and cooling time were calculated for 18 different neutron fluxes, which are presented in contour maps and tables. Irradiation conditions, etc., are the followings: neutron flux (n/sub th/, 1 x 10 exp 12 - 6.8 x 10 exp 14 n/cm exp 2 /sec, uranium quantity, 1 mole (6 x 10 exp 23 atoms, ca. 271 g UO sub 2), U-235 enrichment, 2.7%, irradiation time, 60. - 6 x 10 exp 7 sec (1 min - 1.9 y), cooling time, 0. and 60. - 6 x 10 exp 7 sec (1 min - 1.9 y). The enrichment value represents those for LWRs. To calculate the overall radioactivities, 595 fission product nuclides were introduced. Overall radioactivity calculations were made for 68,000 combinations of irradiation time, cooling time and neutron flux. The many complex decay chains of fission products were treated with CODAC-No.6 computer code. (Atomindex citation 10:481511)

JINR-D-1-11843 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Investigation of the (P, Nd) Reaction on exp 6 Li and exp 7 Li at 670 MeV.
D. Al'brekht, Z. V. Krumshtein, and P. Konts. 1978, 23p
In Russian.
U.S. Sales Only.

The p+<2n> implies d+n reaction on exp 6 Li and exp 7 Li nuclei has been studied at 670 MeV (proton beam of the JINR synchrocyclotron) in a kinematically complete experiment. Coincidences of deuterons and neutrons emitted at 6.5 deg and 147 deg, respectively, were registered. The results were analyzed in terms of the plane wave impulse approximation. Neutron and deuteron spectra, differential cross sections are presented. To clarify the mechanism of the reaction data available on the (p, pd) reactions are also presented. The quasielastic exchange scattering of protons on a pair of correlated neutrons is concluded to contribute strongly to the reactions. (Atomindex citation 10:493332)

JINR-D-2-9259 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Counterterms in the Normal Products Formalism.
S. A. Anikin, and O. I. Zav'yalov. 1975, 7p
In Russian.
U.S. Sales Only.

An algorithm for calculation of the counterterms generating different R-operations is formulated. Generalized Zimmermann's relations connecting different composite fields are derived. (Atomindex citation 10:431163)

JINR-E-1-11653 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Xi exp - and xi exp + Tilde Production in pi exp - p Interactions at 16 GeV/C.
E. Balea, S. Berceanu, C. Coca, A. Sararu, and V. M. Karnaukhov. 1978, 23p
U.S. Sales Only.

Production of xi exp - and xi exp + tilde hyperons has been studied in 16 GeV/c pi exp - p interactions. The cross sections are given for xi exp - and xi exp + tilde production. Distributions and average values of c.m.s. production angle, transverse and longitudinal variables are presented. The characteristics of some xi final states identified are also presented. (Atomindex citation 10:468157)

JINR-E-1-11665 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Inclusive Neutral Particle Production in Anti Pp Interactions at 22.4 GeV/C. 1. Pt. Total and Topological Cross Sections of pi exp 0 , K exp 0 / AntiK exp 0 , lambda /Anti lambda Production. A Test of the KNO Scaling Hypothesis.
E. G. Boos, V. V. Samoilov, and Zh. S. Takibaev. 1978, 14p
U.S. Sales Only.

The results of an analysis of inclusive production of gamma (pi exp 0), K/sub s/y exp 0 , lambda , anti lambda particles in anti pp interactions at 22.4 GeV/c are presented. The total and topological inclusive cross sections of neutral particles were obtained. The charged multiplicity dependences of the mean number of pi exp 0 , K exp 0 / anti K exp 0 , lambda / anti lambda productions were studied. The mean number of lambda / anti lambda particles decreases with increasing charge multiplicity. The KNO scaling hypothesis for pi exp 0 , K/sub s/exp 0 , lambda particles was confirmed. (Atomindex citation 10:468168)

JINR-E-1-11877 PC **A03**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Discovery of Resonances in Multibaryon Systems. Pt. 3. Lambda p-Resonances.
B. A. Shahbazian, P. P. Temnikov, A. A. Timonina, and A. M. Rozhdestvenskij. 1978, 29p
U.S. Sales Only.

Dibaryon lambda p resonance of 2256 MeV/c exp 2 mass, GITA < 15 MeV/c exp 2 (depending on the spin J/sub lambda p/) width, and J/sup p/ > O exp + spin-parity assignments is discovered. The statistical significance of the corresponding peak in lambda p effective mass spectra is defined by more than five standard deviations. Its effective production cross section in n exp 12 C collisions at < P/sub n/ >=7.0 GeV/c is estimated to be sigma/sub pr/ (2256)=(85.3+-20.0) mu b, whereas the effective production cross section in lambda p implies lambda p interactions is sigma/sub pr/ (2256) = 5.3(2J/sub lambda p/+1) mb. The lambda p effective mass spectra which have been investigated in this experiment reveal, apart from the well-known approximately(M/sub lambda / +M/sub p/) MeV/c exp 2 and 2128 MeV/c exp 2 peaks, enhancements including 2256 MeV/c exp 2 peak near the most of the resonance mass values predicted by MIT Bag Model. Possible mechanisms of multibaryon resonance formation are discussed. According to the hypercharge selection rule Y <= 1 multibaryon resonances are shown to be ultra-high density superstrange objects. (Atomindex citation 10:468410)

JINR-E-2-10471 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Electromagnetic Corrections to the Deep Inelastic mu p-Scattering at High Energies.
A. A. Akhundov, D. Yu. Bardin, and N. M. Shumeiko. 1977, 18p
U.S. Sales Only.

The electromagnetic corrections are calculated to the deep inelastic mu p-scattering at muon energy E=50-250 GeV. The structure functions are found by using the latest results of analysis of the presently available data on hadron electroproduction in resonance and deep inelastic region (E<20 GeV) with the subsequent extrapolation to high energies. It is shown that in a large kinematical region the corrections are not sensitive to the fit of structure functions. (Atomindex citation 09:406148)

JINR-E-2-11223 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Inclusive Electroproduction in Quantum Field Theory.
L. Galfi. 1978, 15p
U.S. Sales Only.

It is shown that starting from the quark-pseudoscalar gluon interacting Lagrangian the diagrammatic approach leads to a parton picture for the process e+p implies e+h+X. The scaling behaviour of certain structure functions is investigated in different kinematic regions. (Atomindex citation 09:406178)

JINR-E-2-11244 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Polarization in High Psub(Trans) and Cumulative Hadron Production.
A. V. Efremov. 1978, 16p
U.S. Sales Only.

The final hadron polarization in the high Psub(trans) processes is analyzed in the parton hard scattering picture. Scaling assumption allows a correct qualitative description to be given for the Psub(trans)-behaviour of polarization or escape angle behaviour in cumulative production. The energy scaling and weak dependence on the beam and target type is predicted. A method is proposed for measuring the polarization of hadron jets. (Atomindex citation 09:406171)

JINR-E-2-11386 MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Investigation of Spontaneously Broken Gauge Theories. 1. General Structure and Renormalization.
T. Nagy. 1978, 28p
U.S. Sales Only. Microfiche copies only.

Spontaneously broken gauge theories (SBGT) with effects treated perturbatively are investigated. The general structure of SBGT is exhibited and gauge invariant renormalization program for practical calculations is set up. The proof of renormalizability of Lee and Zinn-Justin are extended to the problems of SBGT. A general semisimple compact gauge group is used. Arbitrary fermion and scalar multiplets are considered. The structure of the Lagrangian is discussed. The problem of quantization is described and the definition of the generating functionals of the Green functions and the Green functions themselves is given. (Atomindex citation 10:434211)

JINR-E-2-11579 MF **A01**
Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German D.R.)
Interaction of Fast Neutrons with Nuclei - Nuclear Reaction Mechanisms.
R. Reif, and S. Sassonov. Jan 79, 207p CONF-7811154-
In German.International symposium on the interaction of fast neutrons with nuclei, Gaussig, German Democratic Republic, 13 Nov 1978.
U.S. Sales Only. Microfiche copies only.

Papers from these proceedings were processed individually for the TIC data base as they were received on ATOMINDEX tapes. (Atomindex citation 10:485339)

JINR-E-2-11628 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Bohr-Sommerfeld Quantization of n-Dimensional Neutral and Charged Pulsons.
I. L. Bogolubsky. 1978, 17p
U.S. Sales Only.

The spectrum of masses of 1) neutral and 2) having elementary charge Q=1 of n-dimensional pulsons (i.e., localized oscillating extended solutions) is found by numerical integration using a computer in the framework of the Klein-Gordon equation with the logarithmic nonlinearity. Computer experiments point out that the pulsons under consideration are apparently stable at any n. (Atomindex citation 10:434076)

JINR-E-2-11679 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.

Unified Treatment of Weak and Electromagnetic Interactions in a SU(4) X SU(4) Chiral Theory of Mesons.
D. Ebert, and M. K. Volkov. 1978, 10p
U.S. Sales Only.

Starting from a phenomenological chiral SU(4)xSU(4) Lagrangian for hadrons weak and electromagnetic interactions are introduced by considering nonlinear realizations of the gauge group SU(2)/sub L/xU(1) of the Weinberg-Salam model. The final effective Lagrangian for the weak interaction of hadrons has the usual current x current structure. The charmed charged currents are of the Cabibbo type, the neutral current satisfies the condition delta S = 0 of the G.I.M. scheme. (Atomindex citation 10:468048)

JINR-E-2-11966 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
New Mechanism for Forming Highly Dense Nuclear Matter in Relativistic Nucleus-Nucleus Collisions.
H. Iwe. 1978, 15p
U.S. Sales Only.

A reaction mechanism is outlined which already during the penetration phase of the collision provides the conditions for phase transitions with reference to the density. In the framework of this relativistic dynamic model possible first-and second-order phase transitions are considered. On this basis and in connection with experimental alpha - particle data the second minimum of the nuclear matter equation of state is found to be located at rho/rho sub 0 =3.7 with a bump width of rho sub 0 order. (Atomindex citation 10:478645)

JINR-E-2-8652 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
About X exp 0 (958) Spin Determination in the Reaction K exp - p implies X exp υ lambda.
R. Lednicky. 1975, 22p
U.S. Sales Only.

It is shown that the absence of anisotropies in the Adair distributions for the reaction K exp - p implies X exp 0 lambda at 1.75 GeV/c) (cos THETA sub (c.m.) > 0.6) does not imply pseudoscalarity of the X (958)-meson. Furthermore, an indication of the opposite character of the anisotropies at 1.75 GeV/c (cos THETA sub(c.m.)> 0.6) compared to those at 2.18 GeV/c(cos THETAsub(c.m.>0.98) is interpreted as a new argument in favour of the spin-2 X exp 0 -meson assignment. More pronounced anisotropies at 1.75 GeV/c can be expected in the interval 0.4 < approximately cos THETA sub(c.m.) < approximately 0.8. The joint distribution of all the X exp 0 -meson and LAMBDA-decay characteristics has been obtained; the likelihood analysis of this distribution, instead of the one-dimensional Adair analysis, is suggested. (Atomindex citation 10:431768)

JINR-E-2-9251 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Automodel Behaviour of the Fixed Angle Scattering Amplitude in the Framework of the Jost-Lehmann-Dyson Representation.
B. Geyer, Th. Gornitz, V. A. Matveev, D. Robaschik, and A. N. Tavkhelidze. 1976, 24p
U.S. Sales Only.

Conditions for asymptotic power behaviour of the scattering amplitude at fixed angles and some properties of the limiting expressions have been established. There is a connection between short distance behaviour of the product of currents and the asymptotics of a particular off-shell amplitude at fixed scattering angles. (Atomindex citation 10:431208)

JINR-E-2-9504 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Dipole Asymptotic Behavior of the Proton Form Factor as a Contribution of Vector Mesons and Central Region.
N. B. Skachkov, and I. L. Solovtsov. 1976, 10p
U.S. Sales Only.

In the method of the invariant description of the proton spatial distribution, vector mesons are found to contribute to the distribution only at distances larger than the proton Compton wavelength. The account of the central part contribution leads to a formula describing well the experimental data. (Atomindex citation 10:428552)

JINR-E-4-11402 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Nuclear Field Theory of Fermi Systems in an External Field.
H. Reinhardt. 1978, 12p
U.S. Sales Only.

The field theory of collective nuclear excitations is extended to interacting Fermi systems in an external field. A rigorous, nonperturbation theoretical derivation of the nuclear field theory (NFT) representation of the external field operators is given. A generating functional is derived to calculate the corresponding matrix elements of the external field operators. The functional contains all the specific NFT diagram rules. The present paper completes the foundation of the NFT. The NFT Lagrangian as well as the NFT representation of an external field operator have been strictly derired in a throughvout field theoretical approach together with the corresponding rules of the diagram nuclear field treatment. (Atomindex citation 10:434231)

JINR-E-4-12012 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Fragmentation of the Deep-Lying Hole States in the Tin Isotopes.
A. I. Vdovin, C. Stoyanov, and 1978, 17p
U.S. Sales Only.

In recent experiments on (d,t) reactions on tin isotopes resonance-like structures have been discovered in all nuclei investigated at 5-7 MeV excitation energies which are due to the excitation of deep-lying hole states 1g/sub 9/2/, 2p/sub 1/2/, 2p/sub 3/2/. 15-25% of the total strength of 1g/sub 9/2/ state is exhausted around maximum. The fragmentation of deep-lying hole neutron states in tin isotopes is calculated in a quasiparticle-phonon formalism and compared with experiment. It is shown that 45% of the total strength function of the 1g/sub 9/2/ state is concentrated around maximum. The main role in the fragmentation of hole states is attributed to the interaction with the quadrupole and octupole vibrations which determines the gross structure of the strength function. (Atomindex citation 10:468427)

JINR-E-4-12093 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Influence of the Two-Phonon Admixture on the M1-Resonance in Spherical Nuclei.
V. Ju. Ponomarev, Ch. Stoyanov, A. I. Vdovin, and V. V. Voronov. 1979, 19p
U.S. Sales Only.

The influence of the two-phonon admixtures on the M1-resonance is spherical nuclei with mass numbers 60 <= A <= 140 is studied. The calculations are performed within the quasiparticle phonon nuclear model with factorized multipole and spin-multipole forces. In nuclei with the number of neutrons 50,82 the role of the two-phonon admixtures is insignificant whereas in other nuclei especially in those with strong pairing in the proton and neutron schemes it is significant. The radiative strength functions are calculated at the neutron binding energy. The results are compared with the experimental data and calculations of other authors. (Atomindex citation 10:493279)

JINR-R-1-11258 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Complete Disintegration of the Carbon Nucleus by pi exp - Mesons with the 40 GeV/C Momentum.
N. Angelov, V. B. Lyubimov, M. I. Solov'ev, D. Tuvdendorzh, and A. I. Anoshin. 1978, 10p
In Russian.
U.S. Sales Only.

The phenomenon of the complete disintegration of the target nucleus has been studied by the example of pi exp -12 C interactions at 40GeV/c. The momenta and the emission angles of all secondary charged particles were measured. The probability of the complete disintegration was determined to be (7.0+-0.3)%. It was shown that the events with the complete disintegration do not differ from "ordinary" pi exp -12 C interactions on their main characteristics. Effect of leading particles in the events with the comptete disintegration of the carbon nucleus was less than in the rest pi exp -12 C. (Atomindex citation 10:493339)

JINR-R-1-11302 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Energy Spectra and A-Dependence of Cumulative Production of Baryon Systems.
A. M. Baldin, A. N. Manyatovskii, N. S. Moroz, Yu. A. Panebrattsev, and A. A. Povtoreiko. 1978, 19p
In Russian.
U.S. Sales Only.

The aim of this paper is to study in detail the energy and A-dependence of cumulative protons, deuterons and tritium. The following nuclei were used as targets: sup(6,7)Li,Be,C,Al,Si, sup(54,56,58)Fe, sup(58,61,64)Ni,Cu, exp 64 Zn, sup(112,118,124)Sn, sup(144,154)Sm, sup(182,186)W, Pb,U. The experiment was performed on the extracted beam of the synchrophasotron of the High Energies Laboratory (slow extraction) at 8.6 GeV/c pulse of primary protons. The results indicate that the energy dependences for all particles and with various nuclei are exponential and similar to each other. The dependence of invariant cross section on a nuclear charge is regular due to the independence of the proton production cross sections and, probably, of that of deuterons upon neutron excess in nuclei. The data allows one to determine parameters of spectra slopes and degree indexes in Z-function. (Atomindex citation 09:406269)

JINR-R-1-11326 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Study on the mu exp - exp 6 Li implies exp 3 H exp 3 H nu Reaction in Photoemulsion Loaded with exp 6 Li.
Yu. A. Batusov, S. A. Bunyatov, and L. D. Vizireva. 1978, 14p
In Russian.
U.S. Sales Only.

The mu exp -6 Li implies exp 3 H exp 3 H nu reaction in photoemulsion loaded with exp 6 Li nuclei is investigated. The emulsion chambers have been exposed by mu -mesons with the energy of 60 MeV at the synchrocyclotron mu -meson channel. 4498 single-beam and 7473 double-beam stars, resulting from mu exp - -mesons capture by exp 6 Li nuclei in photoemulsion. It is obtained that the relative probability value of this reaction equals (9.6+-3.1)x10 exp -2 . Energy and angular distributions of secondary particles from mu exp -6 Li implies exp 3 H exp 3 H nu reaction qualitatively agree with estimates, obtained on the supposition that mu exp - -meson capture by exp 6 Li nuclei in this reaction occurs on a cluster of few nucleons. (Atomindex citation 10:478699)

JINR-R-1-12049 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Some Characteristics of pi exp - Meson Multinucleon Interactions at p=40 GeV/C.
N. S. Angelov, S. Batskovich, V. G. Grishin, L. Jenik, and T. Kanarek. 1978, 11p
In Russian.
U.S. Sales Only.

Experimental data on spectra of secondary pi exp +- mesons produced in interactions of pi exp - mesons with several nucleons of carbon nucleus at p=40GeV/c have been obtained. These distributions are compared to data on pi exp - p interaction at the same energy. It is concluded that in multinucleon interactions a positive charge of target protons is transfered in the main in the central region and centred in the 0 <psub(t) <=0.6 GeV/c interval, where psub(t) is a transverse momentum. At large transverse momenta a mean charge is near to zero. In the pi exp - meson fragmentation region a mean charge of secondary particles decreases with growing of collisions number. (Atomindex citation 10:493340)

JINR-R-1-8719 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Scaling of Topological Cross-Sections Relative to the Longitudinal and Transverse Momenta.
N. O. Akhababyan, L. D. Grekova, V. N. Penev, A. I. Shklovskaya, and A. N. Solomin. 1975, 13p
In Russian.
U.S. Sales Only.

One-particle spectra of longitudinal and transverse momenta of mesons were studied in the c.m.s. of pi exp - p interactions at 40 GeV/c. The obtained experimental data were compared with those for pp-interactions at 300 GeV/c and lower energies. It is shown that the form of distribution of variables psub(tr)/ <psub(tr)> and psub(long)/ <psub(long)> reveals the scaling properties independent of multiplicity, type of particles and initial energy and can be described by universal functions. (Atomindex citation 10:431720)

JINR-R-1-9174 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Simulation, Analysis and Processing of Experimental Data on the Inverse Electroproduction of Pions. II. Part.
S. F. Berezhnev, T. D. Blokhintseva, and G. I. Smirnov. 1975, 20p
In Russian.
U.S. Sales Only.

A system of programmes for simulation, analysis and processing of experimental data on the inverse pion electroproduction has been designed. Algorithms and programmes for the final processing and physical analysis of data obtained in the experiments on investigation of pi exp - p implies e exp + e exp - n reaction have been described. (Atomindex citation 09:406272)

JINR-R-1-9208 MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Charged-Particle Distribution Asymmetry in pi exp - p Interactions at 40 GeV/C and the Quark Model.
V. G. Grishin, E. N. Kladnitskaya, N. N. Mel'nikova, P. M. Sud, and G. Yancho. 1975, 12p
In Russian.
U.S. Sales Only. Microfiche copies only.

The asymmetry in the spectra of charged particles dsigmasub(pi)/dx in the c.m.s. as well as the forward-backward charge asymmetry have been studied in pi exp - p interactions at 40 GeV/c. The results are discussed from the point of view of the quark model. (Atomindex citation 09:406282)

JINR-R-1-9265 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
High-Momentum Parts of Spectra of Secondary Particles Produced in Collisions of 6.3 GeV/C Deuterons with Protons, Deuterons, and Carbon Nuclei.
L. S. Azhgirei, I. K. Vzorov, V. N. Zhmyrov, V. V. Ivanov, and M. A. Ignatenko. 1975, 9p
In Russian.
U.S. Sales Only.

The high-momentum parts of spectra of secondary particles produced at an angle of 103 mrad in the lab.syst. in the interactions of 6.3 GeV/c deuterons with protons, deuterons and carbon nuclei were measured using the magnetic spectrometer with wire spark chambers online with the computer. The structure of the spectra measured shows that multiple N-N-scattering are significant in the nuc(GeV/c) exp 2 . (Atomindex citation 09:406268)

JINR-R-1-9716 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Momentum and Angular Characteristics of Diffractional and Nondiffractional pi exp - p Interactions at 40 GeV/C.
V. G. Grishin, P. P. Kerachev, and E. T. Tsivtsivadze. 1976, 10p
In Russian.
U.S. Sales Only.

The pi sup(+-)-meson and gamma -quantum distribution on the longitudinal rapidities and transversal momenta in diffractional and nondiffractional interactions at p=40 GeV/c are presented. The topological cross sections and the dependence of the average multiplicity of pi exp 0 -mesons on the number of secondary charged particles in the diffraction interactions have been determined. (Atomindex citation 10:431832)

JINR-R-2-11267 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Lab. of Theoretical Physics.
Induced Pseudoscalar Nucleon Form Factor and Its Connection with the Pion-Nucleon Form Factor.
F. G. Tkebuchava. 1978, 7p
In Russian.
U.S. Sales Only.

Experimental data on the induced pseudoscalar nucleon form factor are analysed and pion-nucleon radius is determined. It is shown that this radius is greater than the axial radius of nucleon one. (Atomindex citation 09:416144)

JINR-R-2-11549 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Lab. of Theoretical Physics.
Role of Correlation Characteristics in Study on pi -Meson Radiative Capture by Nuclei.
M. Gmitro, L. A. Tosunyan, and R. A. Ehramzhyan. 1978, 10p
In Russian.
U.S. Sales Only.

Necessity of the study of some correlation characteristics of (pi exp - , gamma) process on light nuclei is grounded. Concrete results of the calculation of the exp 16 O(pi exp - , gamma n) exp 15 N process correlation characteristics are discussed. On exp 16 O nucleus peculiarities of giant resonance excitation are investigated, resonance branch related to nucleon transition through the shell is taken into account. The relative neutron and gamma quantum yield is calculated as well as partial neutron spectra related to pi -meson capture and exp 15 N (epsilonsup(*)=6,3 MeV) state. The gamma spectrum structure in the energy range epsilonsub(gamma) approximately 120 MeV is considered. The considered resonance structure in the partial neutron spectrum can be traced much clearer than in full spectrum. The process characteristics considered depend on the structure of nucleus-target ground state on resonance state structure and daughter nucleus states related to the decay. (Atomindex citation 10:478626)

JINR-R-2-11762 PC **A03**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Lab. of Nuclear Problems.
Existence of the Two-Proton Resonance.
L. I. Lapidus. 1978, 31p
In Russian.
U.S. Sales Only.

Discussed are an experimental evidence for the two-proton resonance existence, the results of the phenomenological analysis on p-p interaction spin dependence near longitudinal momentum Psub(L)=1.5 GeV/c and on high proton polarization on the process of deuteron photodisintegration. With the help of Argonne experimental data the total cross sections of p-p interaction in the spin states are determined. It is shown that there is a possibility of understanding the data on high proton polarization in deuteron photodisintegration in the absence of the two-nucleon resonance, when the amplitude of deuteron photodisintegration is connected with that of pion photoproduction. A necessity of further experiments is under discussion. (Atomindex citation 10:493256)

JINR-R-2-8080 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Lab. of Theoretical Physics.
Determination of the Coupling Constants KN lambda and KN sigma from Data on the Differential Cross Sections of the Anti Pp Implies K exp - K exp + , Anti Pp Implies Anti lambda lambda and Anti Pp Implies Anti sigma exp + sigma exp +.
S. Dubnichka, O. V. Dumbrais, and M. Stashel. 1974, 10p
In Russian.
U.S. Sales Only.

The coupling constants for KN lambda and KN sigma are determined on the basis of available data on differential cross sections of the antipp implies K exp - K exp + , anti pp implies ant lambda lambda and antipp implies sigma exp + sigma exp + reactions. The method is based on the extrapolation of dsigma/d omega to the hyperon and kaon poles, respectively. The results of calculations do not contradict the predictions of the SU(3) symmetry. (Atomindex citation 09:406169)

JINR-R-2-8897 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Model for Hadron Scattering at High Energies.
S. Shch. Mavrodiev. 1975, 19p
In Russian.
U.S. Sales Only.

The Born amplitude of elastic scattering is obtained on the basis of the correspondence principle, relativistic Fourier analysis and the phenomenologically chosen quasipotential, having simple pole structure in relativistic relative coordinate space. The agreement of the amplitude with the proton-proton elastic scattering picture including geometrical scaling (Esup(L) = 75 GeV/c) is tested by means of the numerical analysis. (Atomindex citation 10:431776)

JINR-R-2-9037 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Mu Implies 3E and mu Implies E+ gamma Decays in the Nonlocal Theory of Weak Interactions.
M. Dineikhan, and Kh. Namsrai. 1975, 13p
In Russian.
U.S. Sales Only.

The decays mu implies 3e and mu implies e+ gamma have been studied in the framework of the nonlocal theory of weak interactions. It is assumed that the degree of discernibility nu sub(e)- nu sub(mu) depends on l-elementary length of the long weak interactions and on the nonlocal model form factor. The bounds for l(<=)10 exp -15 cm have been obtained for the case when nu sub(e) and nu sub(mu) are not absolutely identical particles. The latter fact has been established experimentally. (Atomindex citation 09:406168)

JINR-R-2-9038 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Calculation of High-Order Corrections of the Perturbation Theory to Meson Decay in the Nonlocal Quantum Field Theory.
M. Dineikhan, and Kh. Omboo, Z. Namsrai. 1975, 18p
In Russian.
U.S. Sales Only.

The Ksub(L) deg implies mu exp + mu exp - decay rate is investigated within the framework of the nonlocal quantum field theory of weak interaction. Bounds for the l(>approximately)10 exp -16 cm (for the decay Ksub(L)deg implies mu exp + mu exp -) is derived by means of appropriate selection for the form factors of the nonlocal model. Here l is an elementary length determining the domain where the weak interactions become nonlocal. Some possibility of existence of an anomaly interaction between the leptons at high energy is also descussed. (Atomindex citation 09:406167)

JINR-R-2-9082 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Self-Mass of Leptons.
D. Yu. Bardin, and D. I. Blokhintsev. 1975, 11p
In Russian.
U.S. Sales Only.

The charged-lepton self masses are calculated in the second order of four-fermion weak interactions under the assumption that the "bare" mass of one neutrino is not zero. The mass splitting of charged lepton thus calculated turns out to be very small. (Atomindex citation 09:406154)

JINR-R-2-9271 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Strange-Quark Dimension.
D. I. Blokhintsev. 1975, 8p
In Russian.
U.S. Sales Only.

The analysis of the phi implies Ksup(+)Ksup(-) decay resulted in the estimate of the lambda-quark compton length. (Atomindex citation 10:431733)

JINR-R-3-11741 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Isomer Shift of Neutron Resonances. Pt. 2. Accounting for Crystal Lattice Vibration Effects.
K. Zaidel', A. Majster, D. Pabst, and L. B. Pikel'ner. 1978, 19p
In Russian.
U.S. Sales Only.

The Einstein model, generalized two types of atoms, is applied to describe the shape of the neutron resonance of the nucleus, which is part of various chemical compounds of the VX/sub I/(M/sub w/ > > M/sub x/) type. Results of calculations for exp 238 U 6.67 eV are compared with experimental data. The above crystal lattice model permits one to describe the shape of the neutron resonance of nuclei in the crystal compound. The application of such a simple model is largely conditioned by the fact that the resonances own width is much more than the phonon energy hsub(nu 1), therefore flattening of contributions in a cross-section takes place, connected with phonon absorption or excitation. It leads to suppression of the effect of frequency spectrum structure on the cross section profile. The similar role is played by the energy excess of the nucleus output over the phonon energy, which makes the process multiphonon. The resonance shift, conditioned by the sample crystal structure, depends upon adjustment range and target thickness, and is described by a theoretical model rather well. It permits one to separate the selected isomer shift, which does not depend upon the above parameters and upon the disguising effect of the crystal lattice. (Atomindex citation 10:468581)

JINR-R-3-11995 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Doublet Structure of 41.5 EV Neutron Resonance of exp 185 Re.
A. B. Popov, K. Trzeciak, and 1978, 6p
In Russian.
U.S. Sales Only.

A possible doublet structure of 41.5 eV resonance of exp 185 Re is studied. From the transmission measurements of a thin natural rhenium sample on the neutron spectrometer it has been found that this resonance has a doublet structure which can be described by the following parameters: E sub 1 =41.30 eV gGITA/sub n1/=1.31 +- 0.18 MeV, E sub 2 =41.54 eV gGITA/sub n2/=2.73 +- 0.19 MeV. (Atomindex citation 10:468541)

JINR-R-3-12047 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Search for Fission Neutrons with an Energy Above 40 MeV.
A. B. Popov, and G. S. Samosvat. 1978, 9p
In Russian.
U.S. Sales Only.

In the beam of the IBR-30 pulsed reactor the anomalously high energy neutrons were searched by using the time-of-flight method and with the help of anticoincident scintillation detector with low cosmic background. The observation of such neutrons might be the evidence for abnormal superdense nuclei with high binding energy being produced during the fission process in the nuclear fuel of active core of the reactor. The yield of neutrons in the interval from 40 to 200 MeV appeared not to exceed approximately 2x10 exp -8 per fission. (Atomindex citation 10:493441)

JINR-R-4-11332 PC **A03**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Adiabatic Representation of Three-Body Problem with the Coulomb Interaction. 1. The Choice of the Effective Hamiltonian.
S. I. Vinitskii, and L. I. Ponomarev. 1978, 32p
In Russian.
U.S. Sales Only.

A correct dissociation limit for the exchange reaction (a,c)+b implies a+(b,c) has been obtained in the adiabatic representation of the three-body problem (a,b,c). As an example, the calculation of the energy levels of mesic molecules pp mu and dd mu is presented. Relation of various difficulties of the adiabatic method is discussed as well as the ways of their overcoming. (Atomindex citation 10:493312)

JINR-R-4-12001 PC **A03**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Study on the Resonance and Antibound States on the Basis of Analytical Continuation by the Coupling Constant. General Approach.
F. A. Gareev, S. A. Goncharov, V. I. Kukulin, and V. M. Krasnopol'skij. 1978, 27p
In Russian.
U.S. Sales Only.

Resonance and antibound states for both real and complex finite-range potentials are tried by analytical continuation method using the Pade approximant of the second kind in the coupling constant. The complex eigenvalues (zeros of the Jost function or poles of the S-matrix) and corresponding wave functions are determined. The ways of determination of coupling constant threshold value are also worked out. The possibilities of the method are illustrated by taking as an example an exactly solvable model of a square-well potential; the efficiency of approach is shown to determine positions and wave functions of broad and distant resonance and antibound states. Pole behavior as a function of the coupling constant obtained is compared to the exact. (Atomindex citation 10:468311)

JINR-R-4-12048 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Self-Consistent Theory of the Giant Dipole Resonance in Excited Nuclei.
M. I. Baznat, A. V. Ignatyuk, and N. I. Pyatov. 1978, 25p
In Russian.
U.S. Sales Only.

The selfconsistent description of the dipole excitations which uses the translational invariance principle for constructing the effective residual forces is generalized for the case of excited nuclei. The giant dipole resonance theory is developed in the thermodynamical random phase approximation. The theory does not contain any additional parameters besides those in the shell model potential. The temperature dependence of the strength parameters for the isoscalar and isovector forces, as well as of the differential and integrated characteristics of the giant dipole resonance is studied. The importance of the selfconsistency is shown for the description of the integral width of the resonance and for the spectral distribution of the "low-energy" gamma transitions. (Atomindex citation 10:493164)

JINR-R-4-12057 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Description of Structure in Radiative Strength Functions of exp 117 SN Ahd exp 119 SN.
V. V. Voronov, V. G. Soloviev, and 1978, 6p
In Russian.
U.S. Sales Only.

The total E1- and M1-photoabsorption cross section in exp 117 Sn and exp 119 Sn is calculated within the quasiparticle-phonon nuclear model. It is shown that at an energy of about 8 MeV the cross section has a substructure caused by the E1-transitions 3ssub(1/2) implies 2psub(1/2) 3ssub(1/2) implies 2psub(3/2) and a peak of the giant M1-resonance in the region of 8 MeV. The results obtained are in agreement with experimental data. (Atomindex citation 10:478684)

JINR-R-6-11642 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Lifetimes of exp 159 Dy and exp 161 Dy Low Lying Excited States.
B. A. Alikov, N. Z. Marupov, T. M. Muminov, U. S. Salikhbaev, and Ya. Vavryshchuk. 1978, 17p
In Russian.
U.S. Sales Only.

By the e gamma - and gamma gamma -delayed coincidence techniques there have been measured lifetimes of the following excited states in sup(159)Dy: 56keV(Tsub(1/2)=0.21+-0.04ns), 177keV(Tsub(1/2)=9.2+-0.1ns), 209keV(Tsub(1/2)=1.35+-0.07ns), 309keV(Tsub(1/2)<0.2ns), and in sup(161)Dy: 25keV(Tsub(1/2)=28.6+-0.2ns), 43keV(Tsub(1/2)=1.0+-0.2ns), 103keV(Tsub(1/2)=0.64+-0.03ns) 201keV(Tsub(1/2)<=0.3ns). Experimental data on probabilities of E1-, E2- and M1- electromagnetic transitions discharging the excited states are presented. Information on intensities and multipolarities of the gamma -transitions were taken elsewhere. The data obtained made it possible to calculate quadrupole and magnetic dipole moments and parameters of nuclear deformation for corresponding rotational bands. (Atomindex citation 10:493334)

JINR-R-6-11675 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
New Measurement of Deuteron Binding Energy.
Ts. Vylov, K. Ya. Gromov, B. P. Osipenko, V. G. Chumin, and A. I. Ivanov. 1978, 14p
In Russian.
U.S. Sales Only.

A measurement of deuteron binding energy esub(D) has been performed for the first time by using the full absorption peak of gamma -rays emitted at the neutron capture by hydrogen. The measurement is carried out by means of semiconductor Ge(Li) detectors using the set of standard gamma -ray energies based on the value of Esub(gamma)(411.8 exp 198 Hg)=(411.794+-0.007) keV. The value of esub(D)=(2224.572+-0.040) keV is obtained. The systematical error is pointed which has been made in previous measurements of esub(D) due to the use of a double escape peak. Using the new more accurate value of Esub(gamma) (411.8- exp 198 Hg)=(411.805+-0.0015) keV has been recalculated and the value for esub(D)=(2224.631+-0.016) keV has been obtained. (Atomindex citation 10:478781)

JINR-R-6-12144 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Investigation of exp 149 Gd Implies exp 149 Eu Radioactive Decay.
Ts. Vylov, V. V. Kuznetsov, Sh. Omanov, N. B. Badalov, and R. R. Usmanov. 1979, 20p
In Russian.
U.S. Sales Only.

The scheme of the exp 149 Gd implies exp 149 Eu decay is proposed on the basis of the analysis of spectra of gamma -rays, electrons of internal conversion, e- alpha and gamma - gamma coincidences and data on angular correlations. The Gd neutron-deficient nuclides are obtained in reaction of Ta and Er deep disintegration by proton of the 660 MeV energy. The targets are irradiated in the internal synchrocyclotron beam. Monoisotopic sources of exp 149 Gd were obtained by the electromagnetic mass-separator. The proposed scheme of exp 149 Gd decay includes 16 excited levels, of which the 869.01 and 1050.857 keV levels have been introduced for the first time. The scheme of exp 149 Eu levels is discussed. The half-life of the 149.7 keV level is Tsub(1/2)=(0.31+-0.02) ns. Information on nuclear transitions of exp 149 Eu and its comparison with literature data, as well as the states excited during exp 149 Gd decay and the ways of their de-excitation are presented in tables. (Atomindex citation 10:493468)

JINR-R-6-12220 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
Measurement of Lifetimes of exp 159 Er and exp 161 Er Excited States.
B. A. Alikov, N. Z. Marupov, K. M. Muminov, T. M. Muminov, and U. S. Salikhbaev. 1978, 13p
In Russian.
U.S. Sales Only.

Lifetimes of exp 159 Er and exp 161 Er lower excited states have been measured by the delayed coincidence technique at exp 159 Tm and exp 161 Tm radioactive decay. The results are as follows: Tsub(1/2)<=0.2ns for 59.3 keV and Tsub(1/2)=340+-20ns for 182.6 keV in exp 159 Er; Tsub(1/2)<=0.17ns for 59.5 keV, Tsub(1/2)<=0.20ns for 143.9 keV, Tsub(1/2)0.45+-0.05ns for 172.1keV, Tsub(1/2) =71+-7ns for

189.4 keV, Tsub(1/2)=2.2+-0.2ns for 267.5 keV and Tsub(1/2)<=0.3ns for 266.4 keV in exp 161 Er. Reduced probabilities of electromagnetic transitions discharging the exp 159 Er and exp 161 Er states in question have been determined using the experimental values lifetimes, data on intensities and multipole structure of gamma-transitions. The data obtained are in an agreement with the systematics available for probabilities of analogous transitions in the neighbouring deformed nuclei. (Atomindex citation 10:493335)

JINR-R-7-11417 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Nucleon Transfer Reactions in the exp 197 Au + exp 20 Ne System (110 MeV).
A. G. Artyukh, V. V. Volkov, G. F. Gridnev, A. N. Mezentsev, and V. L. Mikheev. 1978, 22p
In Russian.
U.S. Sales Only.

A exp 197 Au target was bombarded with exp 20 Ne ions with an energy of 110 MeV which exceeds the interaction barrier B/sub i/ by a factor of 1.06. By using the delta E,E technique the angular distributions and energy spectra of nucleon transfer products with atomic numbers 4<=Z<=10 have been measured. The yields and energy spectra of C, N and O isotopes have been measured at an angle of 40 deg C by using the magnetic analysis combined with the delta E,E technique. It is concluded that the multinucleon transfer reaction mechanism at energies close to B/sub i/ is substantially different from that at an energy considerably above Bsub. (Atomindex citation 10:468438)

JINR-R-7-11784 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Study on exp 147 Dy and exp 199 Po Charge States Being the Products of Full Fusion Nuclear Reactions.
N. K. Skobelev, G. S. Popeko, Yu. T. Oganesyan, V. Z. Maidikov, and Yu. V. Gofman. 1978, 12p
In Russian.
U.S. Sales Only.

Charge states of exp 147 Dy and exp 199 Po being the products of the exp 113 Cd(exp 40 Ar, 6n) and exp 164 Dy (exp 40 Ar, 5n) nuclear reactions were investigated. Charge distributions were studied on a wide-range magnetic analyzer. The values observed of average charges and half-widths of charge distributions of products under study considerably exceeded the calculated ones. For average charges this difference was 9-12 charge units, and for half-widths was 7-14 charge units. This effect could possibly be due to presence of strongly converted levels in exp 147 Dy and exp 199 Po levels. (Atomindex citation 10:478770)

JINR-1-10150 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Analysis of the pi exp - p implies p pi exp + pi exp - pi exp - Reaction at 5 GeV/C Using Selection Criterion on Curvature of Rotation Line in the Lobachevsky Velocity Space.
N. M. Viryasov, R. M. Lebedev, and V. P. Khen. 1976, 9p
In Russian.
U.S. Sales Only.

The selection criterion research on curvature of the plane rotation line in the Lobachevsky velocity space in terms of the simple statistical model of rho exp 0 -meson production is studied. With this criterion rho exp 0 -mesons were separated in the pi exp - p implies p pi exp + pi exp - pi exp - reaction at 5 GeV/c, which are produced in the region of high transferred momenta. rho exp 0 -meson formation was modelled with matrix elements. The comparative evaluation of the experimental distribution with the theoretic calculation shows that the criterion under review permites quite safe separation of rho exp 0 -mesons, produced in the region of high transferred momenta. (Atomindex citation 10:431840)

JINR-1-10669 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Cross Sections of Reaction Channels in Five-Prong Stars in Np Interactions at P/sub n/ = 5.1 GeV/C.
A. Abdivaliev, K. Beshliu, A. P. Gasparyan, S. Gruia, and A. P. Ierusalimov. 1977, 14p
In Russian.
U.S. Sales Only.

Cross-sections of various reaction channels in five-prong stars of np-interactions at Psub(n)= (5.10 +- 0.17) GeV/c momentum, which arise in 1 m hydrogen chamber have been determined. Reaction channel separation methods in this interaction class have been reported. (Atomindex citation 09:406264)

JINR-1-10916 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Determination of Cross Sections of Resonance Production in the Np Implies Pp pi exp + pi exp - pi exp - at 5.1 GeV/C Using the Technique of Final Particle Ordering on Rapidities.
A. Abdivaliev, K. Beshliu, A. P. Gasparyan, S. Gruia, and A. P. Ierusalimov. 1977, 13p
In Russian.
U.S. Sales Only.

The cross-sections of production of different resonances in the reaction np implies pp pi exp + pi exp - pi exp - are found for 5.1 GeV/c momentum of incident neutrons. The analysis of effective-mass distributions was performed after velocity-ordering of the outgoing particles. The reaction np implies pp pi exp + pi exp - pi exp - is shown to proceed via nucleon isobar production with 95% probability. There are no indications on production of boson resonances. (Atomindex citation 09:406263)

JINR-1-12006 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Modelling of the Associative Multiplicity in the Reaction pi exp - p implies pi exp 0 + X at 5 GeV/C.
J. Antos, A. S. Kurilin, and V. S. Rumyantsev. 1978, 15p
In Russian.
U.S. Sales Only.

On the basis of the formerly obtained partial cross sections of pi exp - p reactions at 5 GeV/c the inclusive reaction pi exp - p implies pi exp 0 + x is modelled as a sum of exclusive channels. Events in the definite exclusive channel are distributed proportionally to the phase space. The characteristic of the parameters of the distribution-associative multiplicity as a function of the missing mass to the pi exp 0 -meson is mainly due to energy-momentum conservation law. (Atomindex citation 10:468014)

JINR-1-12043 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Double Differential Distributions of Charged Particles in pi exp - -C Interactions at 5 GeV/C.
O. B. Abdinov, A. T. Abrosimov, and A. A. Bajramov. 1978, 10p
In Russian.
U.S. Sales Only.

Multiplicity distributions and momentum spectra as a function of the emission angle in the laboratory system for protons, pi exp - -mesons and high energy positively charged particles are presented. The comparison of experimental data with those evaluated ones with the cascade evaporation model shows that the double differential distributions of charged particles in pi exp - C interactions at 5 GeV/c are satisfactorily described. (Atomindex citation 10:468149)

JINR-1-12114 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Methodological Problems of Determination of Cross Sections in Inelastic Interactions of Relativistic Nuclei.
N. Akhababyan, Ts. Baatar, A. P. Gasparyan, I. A. Ivanovskaya, and A. P. Cheplakov. 1979, 18p
In Russian.
U.S. Sales Only.

Methodical problems are considered arising at the determination of cross sections of p, d, He and C relativistic nuclei inelastic interactions with a target consisting of thin tantalum plates in the 2 m propane bubble chamber. The experimental data have been obtained at a primary impulse per nucleon P sub 0 =4.2 GeV/c. The available experimental cross sections of the interactions of relativistic nuctei with nuclei are reviewed. It is shown that cross sections of inelastic interactions are in a satisfactory agreement with geometrical model calculations. (Atomindex citation 10:493330)

JINR-1-12186 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
He-D Small Angle Elastic Scattering at 9.0 and 19.8 GeV/C.
V. V. Avdeichikov, G. G. Beznogikh, and V. A. Budilov. 1979, 16p
In Russian.
U.S. Sales Only.

Results of experimental investigations into differential cross sections of the He-d elastic scattering at 9.0 and 19.8 GeV/c and 4-momentum transfers squared 0.0028 < alpha t alpha <=0.168 (GeV/c) exp 2 are presented. The experiment was performed with the JINR synchrophasatron alpha beam using the technique of beam multiple transmission through a thin target. The data have been analyzed in terms of the Bethe formula with the nuclear amplitude taken in the Glauber model. Thus calculated have been the He-d total cross sections, the slope parameter and the real-to-imaginary amplitude ratio. The Glauber model is shown to describe satisfactorily the He-d elastic scattering at alpha t alpha <=0.168 (GeV/c) exp 2 . (Atomindex citation 10:493355)

JINR-1-8905 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR).
System of Programs for the Analysis of Data of Scanning the Film from Bubble Chambers.
A. Valkarova, and Z. Zlatanov. 1975, 11p
In Russian.
U.S. Sales Only.

The system is described of the program for experimental data analysis on scanning and multiple production of charged particles in the bubble chambers. The programs have been written on Fortran for BESM-6 and SDS-6200 computers. (Atomindex citation 09:406296)

JYFL-RR-3/79 PC **A05**/MF **A01**
Jyvaeskylae Univ. (Finland). Dept. of Physics.
E0 and E2 Decay of Low-Lying 0 exp + States in the Even-Even Nuclei exp 206 Pb, exp 208 Po, exp 112-120 SN and exp 112 exp 114 Cd.
Thesis (Ph.D.).
R. Julin. Apr 79, 78p
U.S. Sales Only.

Several new methods of in-beam conversion-electron and gamma -ray spectrometry, applicable in the determination of E0 and E2 decay properties of low-lying 0 exp + states in even-mass nuclei, have been developed. The main attention has been paid to direct lifetime-measurement and coincidence methods based on the use of the natural pulsing of a cyclotron beam. With the aid of these methods, the similarity of the absolute decay rates of the two-neutron-hole 0 exp +2 states in the N = 124 nuclei exp 206 Pb and exp 208 Po has been shown. A systematic investigation of the de-excitation of the 0 exp +2 and 0 exp +3 states in exp 112 , exp 11 exp 4 , exp 116 , exp 118 , exp 120 Sn has been carried out. Twelve E0 transitions connecting the 0 exp + states have been observed, including very strong low-energy E0 transitions between the excited 0 exp + states, and several absolute transition probabilities have been determined. Furthermore, the new techniques have been applied successfully in determining the absolute E0 and E2 transition rates from the 0 exp +2 and 0 exp +3 states in exp 112 Cd and exp 114 Cd. The use of isotope-shift data in the calculation of the monopole strengths in exp 206 Pb and exp 208 Po is discussed. The results on even Sn and Cd nuclei are discussed within the framework of the coexistence of different shapes and of configuration mixing. (Atomindex citation 10:478738)

KFKI-1977-61 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Half-off-Shell Phase Equations for Non-Local Interactions.
T. Dolinszky. Aug 77, 8p
U.S. Sales Only.

The Sobel equations for half-shell phase functions are generalized to cover non-local interactions via explicit expressions of the half-shell phase shift in terms of the on-shell phase functions. All partial waves on equal footing are treated. It can be shown that the two types of on-shell phase functions are asymptotically equivalent for non-local interactions too. Therefore, the two types of the half-shell phase functions will be found to coincide asymptotically, providing thus an expression of the half-shell phase shift itself in terms of the on-shell phase function. (Atomindex citation 10:434119)

KFKI-1977-64 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Nonrelativistic Multichannel Quantum Scattering Theory in a Two Hilbert Space Formulation.
C. Chandler. Aug 77, 12p CONF-7709185-1
International conference on operator algebras, ideals, and their applications in theoretical physics, Leipzig, F.R. Germany, 11 Sep 1977.
U.S. Sales Only.

A two-Hilbert-space form of an abstract scattering theory specifically applicable to multichannel quantum scattering problems is outlined. General physical foundations of the theory are reviewed. Further topics discussed include the invariance principle, asymptotic completeness of the wave operators, representations of the scattering operator in terms of transition operators and fundamental equations that these transition operators satisfy. Outstanding problems, including the difficulties of including Coulomb interactions in the theory, are pointed out. (Atomindex citation 10:434101)

KFKI-1977-77 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Multiparticle Decays of New Heavy Particles.
I. Montvay. Sep 77, 20p CONF-770712-9
European conference on particle physics, Budapest, Hungary, 4 Jul 1977.
U.S. Sales Only.

The discovery of the new heavy particles (the psi family, charmed mesons and baryons) gives new possibilities of a better understanding of the fundamental interactions. The spectroscopy of new hadron families offers a unique opportunity to study quark bound states. They are heavy enough to be understandable in the frame of the non-relativistic quark models. The level spacing and the decay characteristics (selection rules, branching ratios, decay times) are suitable to fit different theoretical models. Due to the large masses of the new hadrons there is in most cases enough energy to produce a lot of light hadrons, therefore the multiparticle models of the strong interaction are applicable. General features of experimental observations, theoretical assumptions and statistical models are discussed in detail. (Atomindex citation 10:435230)

KFKI-1977-88 MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
General off-Shell Phase Equations for Local Interactions.
T. Dolinszky. Nov 77, 13p
U.S. Sales Only. Microfiche copies only.

First order linear differential equations are developed for the completely off-shell phase shift in terms of the cut-off radius of the local two-body interaction. The input to these equations involves on-shell as well as half-off-shell phase functions the latter of which in turn satisfy first order linear differential equations with on-shell phase functions as input. It is concluded that the solution of these new first-order linear differential equations developed within the framework of the standard phase approach is an appropriate means of calculating completely off-shell phase shifts. (Atomindex citation 10:434120)

KFKI-1977-89 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
Variational Formalism for Spin Particles.
P. Horvathy. Nov 77, 11p
U.S. Sales Only.

The geometrical formulation of Hamilton's principle presented in a previous paper has been related to the usual one in terms of Lagrangian functions. The exact conditions for their equivalence are obtained and a method is given for the construction of a Lagrangian function. The formalism is extended to spin particles and a local Lagrangian is constructed in this case, too. However, this function cannot be extended to a global one. (Atomindex citation 10:434164)

KFKI-1977-91 PC **A03**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
SU(3) Properties of Semileptonic and Nonleptonic Decays of Mesons.
I. Montvay. Nov 77, 35p
U.S. Sales Only.

The recent discovery of charmed D and F mesons led to an accumulation of a lot of information on the weak decays of these particles. The facts known at present are generally consistent with the Glashow-Iliopoulos-Maiami scheme for the weak currents, which are predicted to be the fourth flavour of quarks, the charm. The weak decays of the charmed mesons are governed by SU(3) rules analogous to the Okubo-Zweig-Iizuka rule for strong decays. Such Su(3) rules are given for semileptonic and nonleptonic decays of strange and charmed mesons. These relations depend on the colour structure of currents in the nonleptonic case. (Atomindex citation 10:435231)

KFKI-1978-5 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
G/sub 9/2/ Isobaric Analog Resonances in the exp 56 Fe(P, gamma) exp 57 Co Reaction.
I. Fodor, J. Sziklai, B. Kardon, J. Rama Rao, and K. Beckert. Jan 78, 16p
U.S. Sales Only.

A fragmented g/sub 9/2/ analog resonance has been found in exp 57 Co corresponding to the E/sub x/ = 2.454 MeV level in the exp 57 Fe parent nucleus. The resonance was located through the exp 56 Fe(p, gamma) exp 57 Co reaction. Total gamma -ray spectra were measured with a Ge(Li) detector in 2 keV steps in the expected proton energy range. Excitation functions for the different primary gamma transitions were constructed. The g/sub 9/2/ IAR was found in two components at E/sub p/=3728 and 3735 keV. The angular distributions of gamma -rays were measured at these two bombarding proton energies. The two resonances were suggested as having spin and parity J/sup pi /=9/2/sup +/ based on the gamma -ray excitation functions and angular distribution measurements. The gamma -ray branchings and absolute transition probabilities were also determined. The M1 gamma transitions from the gsub(9/2) IAR components going to the possible antianalog level at E/sub x/=4.585 MeV energy or excitation have absolute transition strengths of 1.8x10 exp -2 W.u. and 1.2x10 exp -2 W.u. (Atomindex citation 10:468479)

KFTI-77-36 PC **A03**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Distribution of delta Isobar Decay Products in the gamma N Implies pi delta Reaction Polarized gamma Quanta Interaction with Polarized Nucleons.
A. A. Zayats, and N. P. Merenkov. 1977, 29p
In Russian.
U.S. Sales Only.

The properties of the density matrix of the delta -isobar in the gamma N implies pi delta reaction for the case of polarized initial particles were investigated. The angular distribution of the decay products of the delta =-isobar is discussed. It is shown that by measuring the differential cross section and the angular distribution of the decay products of the delta -isobar it is possible, with the aid of two types of experiment (with polarized gamma - quanta and nonpolarized nucleons, and vice versa), to determine the amplitudes characterizing the dynamics of the gamma N implies pi delta process. It is also shown that in order to measure separately the contributions from the natural and unnatural parities from the angular distribution of the decay products of the delta -isobar it is necessary to carry out combined experiments, where db bined experiments, where both the gamma -quantum and the nucleon are polarized. (Atomindex citation 10:428562)

KFTI-77-54 MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Superconvergent Sum Rules for Pion Electro Production on Nucleons.
Yu. V. Kulish. 1977, 15p
In Russian.
U.S. Sales Only. Microfiche copies only.

The conditions for the saturation of superconverging sum rules for invariant amplitudes of the electroproduction of pions on nucleons in dependence on the 4-momentum transfer squared of a virtual photon were investigated. By using the dependence of sum rules on the value of a series of ratios was obtained between the excitation amplitudes of different nucleon resonances assuming that the contributions from the high-energy range and the nonresonance background can be neglected. Restricting themselves to the first nucleon resonance, for the ratio of the multipole amplitudes the expression is found which agrees with the experimental data available. (Atomindex citation 10:435206)

KFTI-77-7 MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
High Energy Physics and Nuclear Physics.
1977, 79p
In Russian.
U.S. Sales Only. Microfiche copies only.

The object of investigation is the KX radiation of quasimolecules produced at collision of heavy ions with atoms. In collision, electron may change their states adiabatically and form, at sufficiently small distances R between nuclei, quasimolecular states, which transform, in the limiting case of R implies 0, to the states of a quasiatom with an atomic number of Z = Z sub 1 + Z sub 2 , where Z sub 1 and Z sub 2 are the atomic numbers of the heavy ion and atom. The discussion is restricted to collision experiments of Z = Z sub 1 + Z sub 2 > 50. The obtained and published data on the systems Ni+Ni, Nb+Nb, Zr+Nb, La+La, La+Xe, Pb+Pb, and Bi+Bi are analyzed. At a sufficiently high ion energy, one observes an asymmetry of a quasimolecular spectrum, the asymmetry having maximum in the range of the characteristic KX energy of a quasiatom. Data on the absolute yield Y(Ksub(alpha)) of individual high-energy components of X-rays excited on collision of heavy ions are presented. A considerable drop in yield Y(Ksub(alpha)) with increasing Z is noted. (Atomindex citation 10:434321)

KIYI-78-12 PC **A03**/MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Yadernykh Issledovanii.
Evaluated Neutron Cross Sections and Resonance Integrals of the Fission Products with Z=51-56.
A. F. Fedorova, and Zh. I. Pisanko. 1978, 40p
In Russian.
U.S. Sales Only.

Evaluated are the cross sections and resonance integrals of fission products (Sb, Te, X, Xe, Cs, Ba) isotopes with Z=51-56. Calculated are the contributions of positive resonances to cross sections ar neutron velocity Vsub(n)=2200 m/s. Presented are the recommended neutron cross sections at a given velocity. (Atomindex citation 10:493206)

KIYI-78-3 MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Yadernykh Issledovanij.
Pd, Pt, alpha D and alpha T Elastic Scattering.
A. E. Borzakovskii. 1978, 13p
In Russian.
U.S. Sales Only. Microfiche copies only.

Measured are the angular distributions of differential cross section of pd, pt, alpha d and alpha t elastic scattering at proton energy of 6.8 MeV and alpha -particle of 27.2 MeV and also the polarization value in pt elastic scattering at Esub(p)=6.0 MeV. The obtained data are analyzed in the phase shift analysis frame. Found sets of phases and absorption parameters satisfactorily describe the experimental data. (Atomindex citation 10:493375)

KIYI-78-9 PC **A03**/MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Yadernykh Issledovanii.
Evaluated Neutron Cross Sections and Resonance Integrals of the Fission Products from Z=32-37.
Zh. I. Pisanko, and A. F. Fedorova. 1978, 43p
In Russian.
U.S. Sales Only.

Presented are the recommended values of neutron cross sections for neutron velocity Vsub(n)=2200 m/s and resonance integrals for isotopes of elements with Z=32-37 (Ge, As, Se, Br, Kr, Rb). (Atomindex citation 10:493274)

LBL-10388 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Pion Condensation in a Theory Consistent with Bulk Properties of Nuclear Matter.
N. K. Glendenning. Jan 80, 8p CONF-800121-1
Contract W-7405-ENG-48
Workshop on gross properties of nuclei and nuclear excitations, Hirschegg, Austria, 14 Jan 1980.

A relativistic field theory of nuclear matter is solved for the self-consistent field strengths inthe mean-field approximation. The theory is constrained to reproduce the bulk properties of nuclear matter. A weak pion condensate is compatible with this constraint. At least this is encouraging as concerns the possible existence of a new phase of nuclear matter. In contrast, the Lee-Wick density isomer is probably not compatible with the properties of nuclear matter. 3 figures. (ERA citation 05:017123)

LYCEN-7906 PC **A02**/MF **A01**
Lyon-1 Univ., Villeurbanne (France). Inst. de Physique Nucleaire.
Evidence for exp 116 Xe Quasi-Rotational Bands Populated in the Decays of 0.7 Sec. And 4.1 Sec. Exp 116 Cs States.
G. Marguier, A. Charvet, J. Genevey-Rivier, C. Richard-Serre, and A. Knipper. Jan 79, 21p
U.S. Sales Only.

Using a spallation reaction induced by exp 3 He of 910 MeV, the decay of mass-separated exp 116 Cs has been investigated at the ISOLDE facility. Half-life measurements have been performed. It has been found that the short lived isomer (Tsub(1/2)=0.72 sec.) populates mainly the first 2 exp + exp 116 Xe level, whereas the state with Tsub(1/2)=4.1 sec. must have a high spin (J>=4). A scheme of exp 116 Xe including levels of quasi-ground state, gamma and beta bands, has been established. The level structure of exp 116 Xe discussed in the framework of light even Xenon systematics. (Atomindex citation 10:493435)

MPI-PAE/Exp.El.-73 MF **A01**
Max-Planck-Inst. fuer Physik und Astrophysik, Munich (Germany, F.R.).
Forward A sub 2+ Production in pi exp + p Implies K exp +- KS exp 0 P at 12.7 GeV/c.
B. Hyams, C. Jones, P. Weilhammer, W. Blum, and H. Dietl. Aug 78, 39p
U.S. Sales Only. Microfiche copies only.

Approximately 350 A sub 2+ events have been observed in the reaction pi exp + p implies K exp +- KS exp 0 p(K exp -0 S implies pi exp + pi exp -) at an incident pi exp + laboratory momentum of 12.7 GeV/c. The events are distributed over a range of four-momentum transfer squared 0.01 <= -t <= 0.60 (GeV/c) exp 2 and K exp +- KS exp 0 mass 1.11 <= mK+K-S sub 0 <= 1.51 GeV. A Breit-Wigner fit to the mass spectrum yields a mass for the A sub 2+ mA sub 2 +- 1.324 +- 0.005 GeV and a width 0 = 0.110 +- 0.018 GeV. We find a cross section sigma(pi exp + p implies A sub 2+ p) = 1.71 +- 0.30 mu b referring to the above-mentioned mass and t range and A sub 2+ implies K exp +- KS exp 0 with K exp - S exp 0 implies pi exp + pi exp - . The spin-space density matrix in the Gottfried-Jackson frame is practically saturated by rho sub 11 approximately rho sub 1 - sub 1 = 1/2 suggesting natural parity exchanges only. There is a forward dip in the angular distribution consistent with dominance of s-channel net helicity flip amplitudes and rho and f Regge exchanges suffice to describe adequately our differential cross sections. (orig.) 891 WL. (Atomindex citation 10:428593)

NBI-HE-78-32 PC **A03**/MF **A01**
Niels Bohr Inst., Copenhagen (Denmark).
Quantum Mass Corrections to Supersymmetric Soliton Theories in Two Dimensions.
R. Horsley. Nov 78, 38p
U.S. Sales Only.

The author considers a two dimensional supersymmetric Lagrangian and computes to 0(h/2 pi) exp 2 mass corrections to the classical mass of a static soliton. Due to the supersymmetric nature of the theory, these corrections vanish. (Atomindex citation 10:431220)

NIRS-R-6 PC **A03**/MF **A01**
National Inst. of Radiological Sciences, Chiba (Japan).
Expedient Calculation Methods of Spatial Dose Distribution of High-Energy Charged Particles.
K. Kawachi. Jul 77, 31p
In Japanese.
U.S. Sales Only.

The electron dose distribution calculation formula was derived from the age diffusion equation. The age parameter, increases with penetrating depth or degradation of electron energy, and is related with the radial deflections from the incident beam axis due to the multiple scattering along the path in the medium. The expedient calculation method for proton dosimetry has been derived, utilizing the error function. In the proton radiography, the monoenergetic incidence of proton beam affords a good resolution in detecting a smaller difference in tumor thickness and, on the contrary, the spread-out energy incidence is capable of a wider dynamic range of the application. Assuming that there is 5% difference of electron density between tumor and the surrounding normal tissue, the minimum detectable tumor thickness values are 7.8, 2.0 and 0.8 cm for the monoenergetic incidence of 250 MeV proton with the fluence of 10 exp 3 , 10 exp 4 and 10 exp 5 protons/cm exp 2 , respectively. The radiation exposure due to this proton radiography was estimated about 1 mrad for the incident proton fluence of 10 exp 4 protons/cm exp 2 . The spatial dose distributions were obtained as the isodose distributions of the proton beams, taking into consideration the effects of multiple scattering of protons in the medium. The experimental results of the depth dose distributions for two different diameter beams are in satisfactory agreement with the calculated curves. And these results indicated that the depth dose distribution of 1 cm diameter beam was not differed from that of the broad beam, but 0.3 cm diameter beam formed a different distribution from it. These calculation methods and results will be applied to design the proton range modurator and the spot scanning system for proton therapy, and also to calculate the spatial dose distributions in more realistic inhomogeneous media. (Atomindex citation 09:411372)

PB80-178072 Not available NTIS
National Bureau of Standards, Washington, DC.
Coincidence Experiments with GEV Electron Beams.
Final rept.,
J. S. O'Connell. 1980, 7p
Pub. in Nucl. Phys. A, v355 p563-569 1980.

Coincidence measurements with electron scattering at high momentum and energy transfer to the nucleus are examined from the point of view of determining the basic hadron-hadron interaction parameters. Electron beam characteristics and possible accelerators to produce 100% duty factor beams are discussed.

PB80-178106 Not available NTIS
National Bureau of Standards, Washington, DC.
Quartet Effects in Masses and in Charge Exchange Reactions.
Final rept.,
M. Danos. 1980, 13p
Pub. in Proc. Int. Symp. on Future Directions in Studies of Nuclei Far From Stability, Held at Nashville, TN on Sep 10-14, 1979 p195-207.

A mass formula based on the quartet model is presented; some differences in its predictions with that of other mass formulae are pointed out. The possibility of reaching highly unstable nuclei by charge exchange reactions is discussed. It is shown that surface quartets play a decisive role in multiple charge transfer processes.

PUC-TN-11/78 PC **A03**/MF **A01**
Pontificia Univ. Catolica do Rio de Janeiro (Brazil). Inst. de Fisica.
Process pi exp - P Implies mu N with QPC Model for A sub 2 Exchange.
E. M. Ferreira, A. N. Mitra, and Z. D. Thome. Jun 78, 30p
U.S. Sales Only.

The process pi exp - p implies mu n is studied the 20-200Gev/c range for plab, employing the quark pair creation (QPC) model to simulate Reggeized A sub 2 -exchange (A subj) via the Van Hove mechanism. (Atomindex citation 10:431743)

PUC-TN-16/78 PC **A02**/MF **A01**
Pontificia Univ. Catolica do Rio de Janeiro (Brazil). Inst. de Fisica.
Relation Between Fields and Potentials in Non-Abelian Gauge Theories.
C. G. Bollini, J. J. Giambiagi, and J. Tiomno. Aug 78, 16p
U.S. Sales Only.

It is shown that, to any element U(x) of the gauge group it corresponds to one parameter family of fields. Each member of the family can be derived from two different potentials not related by any gauge transformation, unless U(x) satisfies an integrability condition. The example given by T. T. Wu and C.N Yang, for three dimensions and the group SU sub 2 , characterized by the unit radial vector (n vector = r vector / r), is generalized to any arbitrary unit vector field n vector (r vector) (n vector. n vector =1). (Atomindex citation 10:431173)

RL-78-041 MF **A01**
Science Research Council, Chilton (UK). Rutherford Lab.
Reaction pi exp - p Implies K exp 0 lambda exp 0 Up to 1334 MeV/c.
R. D. Baker, J. A. Blissett, and I. J. Bloodworth. May 78, 28p
U.S. Sales Only. Microfiche copies only.

New data on differential cross-sections and polarisation are presented at nine incident momenta up to 1334 MeV/c. An energy-dependent phase shift analysis has been made and resonance parameters are given. (Atomindex citation 09:416160)

RL-78-089 MF **A01**
Science Research Council, Chilton (England). Rutherford Lab.
Baryoniums Coupled Directly to the Photon.
C. Hong-Mo. Sep 78, 4p
U.S. Sales Only. Microfiche copies only.

This note is an addendum to a paper recently presented by the author (Hong-Mo. Baryonium Spectroscopy as a Test for Colour Dynamics. IV European Antiproton Symposium. June 1978. CERN preprint TH2540 (1978)). Attention is drawn to a further group of experiments which yield information on the diquonium spectrum, namely e exp + e exp - annihilation and diffractive photo-production, which select states with Jsup(PC) = 1 exp -- . A spectrum of diquoniums with these quantum numbers, in which the splitting due to L . S interactions between the diquark and antidiquark have been included, is shown and discussed. (Atomindex citation 10:435179)

RL-78-097 PC **A03**/MF **A01**
Science Research Council, Chilton (UK). Rutherford Lab.
Guide to the Durham-Rutherford High Energy Physics Databases.
F. D. Gault, B. J. Read, and R. G. Roberts. Oct 78, 27p
U.S. Sales Only.

A description is given of the databases of high energy physics experimental scattering data available on the Rutherford Laboratory computer network, together with instructions for data retrieval and example searches. (Atomindex citation 10:434014)

RRK-78-15 PC **A02**/MF **A01**
Hiroshima Univ., Takehara (Japan). Research Inst. for Theoretical Physics.
Renormalization Scheme of a Canonical Yang-Mills Field Theory with Invariant Gauge-Families.
Kan-ichi Yokoyama. May 78, 12p
U.S. Sales Only.

A renormalization scheme of a canonical Yang-Mills field theory proposed previously is studied on the basis of gauge-covariance. Asymptotic completeness and preservation of the gauge structure through renormalization are presumably adopted. It is shown that the renormalization scheme is achieved analogously to the case of Abelian-gauge field theories. A shift of gauge parameters also takes place through renormalization. (Atomindex citation 10:434271)

WIS-Ph-78/27 MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Nuclear Physics.
Particle Distributions in Ordered Jets.
Y. Zarmi, and E. Kogan. 1978, 24p
U.S. Sales Only. Microfiche copies only.

For specific assumptions about the space-time evolution of hadronic jets, within the framework of a Monte-Carlo calculation, the transverse and longitudinal momentum distributins of particles within the jets are obtained. The transverse momentum distributions are sensitive to the space-time evolution picture. The observed energy dependence of the average transverse momentum and the well-known seagull effect are qualitatively reproduced within a picture in which Slow particles in a jet are produced First, and Fast ones - Last. (Atomindex citation 10:428610)

20I. Plasma Physics

AD-A083 702/1 PC **A06**/MF **A01**
Jaycor Alexandria VA
Axial and Radial Compression of Ion Beams.
Final rept. 15 Jan 79-26 Feb 80,
Shyke A. Goldstein, and Paul F. Ottinger. Mar 80, 109p Rept no. JAYCOR-TPD200-80-003-FR
Contract N00173-79-C-0420

The present report concentrates on the physics of propagating intense ion beams in plasma channels. In particular, the theoretical aspects are studied of the possible effects during ion beam transport on the structure of electromagnetic fields in the plasma. The ion orbits were solved for different classes of plasma channels including bumpy ones in order to evaluate the sensitivity of beam losses due to channels that deviate from idealistic shapes. The consideration of different plasma instabilities, the hydrodynamic motion of the plasma, propagation in filamentary channels and beam energy losses put realistic limits on how much ion current can be propagated using the simple steady plasma channel concept. Axial bunching of the beam (via time dependent voltage ramping of the ion diode) was analyzed and found to be sound concept as long as no more than an order of magnitude pulse compression is attempted. The radial compression is viable on a small scale in tapered channels (giving a factor of 2 increase in current density) and on a large scale if self magnetic fields fully penetrate the media (giving rise to an order of magnitude increase in ion beam current density). Further theoretical investigation on the details of the above mechanisms are presently in progress including new plasma channel schemes that help to push upwards the limits on the ion currents.

AD-A083 913/4 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Accurate Analytic Approximations and Numerical Solutions for the Structure of Quasi-Static Laser Driven Ablation Layers.
Memorandum rept.,
Joseph H. Orens. 29 Feb 80, 22p Rept no. NRL-MR-4167

Time dependent simulations of a laser driven accelerating shell ad ablation layer have shown the presence of long lived quasi-static density and pressure profiles. This paper models the equilibrium solutions for a laser ablation layer both analytically and numerically and develops a detailed understanding of the nature of this flow. Such a model enables the calculation of the quantitative dependence of the shell thickness and acceleration, the peak density, velocity, and temperature of the shell, the width of the Rayleigh-Taylor region, and the distance to the critical surface on the total plasma mass, the critical density, and the absorbed and reflected laser flow. (Author)

AD-A083 915/9 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Steady State Magnetic Diffusion from Resistive Interchange Modes.
Memorandum rept.,
Wallace M. Manheimer. 5 Mar 80, 10p Rept no. NRL-MR-4173

It is shown that a likely nonlinear state for resistive interchange modes is one in which velocity vortex structure is balanced in Ohmic dissipation. Macroscopically this is manifested as magnetic diffusion and anomalous energy transport. The results are discussed and compared with recent experiments. (Author)

AD-A083 917/5 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Ion Beam Propagation in a Filamented Channel.
Memorandum rept.,
P. F. Ottinger, S. A. Goldstein, and D. Mosher. 3 Mar 80, 13p Rept no. NRL-MR-4180

The production of intense focused ion beams has led to the consideration of using z-discharge plasma channels to transport them several meters to inertial fusion targets. Analysis has shown that current bunching will occur in the channel during transport. In this report ion beam propagation in a filamented channel is investigated in order to determine the effects on radial beam containment in channels and on the radial beam density profile. (Author)

CNEN-RT/FI-78-13 PC **A04**/MF **A01**
Comitato Nazionale per l'Energia Nucleare, Rome (Italy).
Slowing down of alpha Particles in a Tokamak Fusion Reactor. Numerical and Analytical Results.
E. Bittoni, and L. Felician. 1978, 70p
U.S. Sales Only.

The dynamics of alpha particles in a Tokamak is the main subject of this study: particular attention is devoted to orbit topology and to the fraction of alpha particles not contained in the reactor. A slowing-down model (S.D.M.) is presented, constituting a first improvement of the single orbit model (S.O.M.) for energy deposition in the plasma. (Atomindex citation 10:419611)

COO-2456-57 PC **A08**/MF **A01**
Columbia Univ., New York. Plasma Physics Lab.
Numerical Simulation Studies of Toroidal Pinches.
W. Park. 1978, 157p
Contract EY-76-S-02-2456

A time dependent two-dimensional MHD calculation for pinch experiments, previously developed at Columbia, is improved and modified so that very long calculations (until the plasma reaches a quasi-equilibrium state) are possible. The calculation method is presented, and the simulation results of the Jutphaas screw pinch SP-1 and the Los Alamos reverse-field pinches ZT-I, ZT-S and ZT-40 are studied. (ERA citation 05:017180)

DOE/ET/53087-1 PC **A04**/MF **A01**
United Technologies Research Center, East Hartford, CT.
Plasma Stabilization Experiment. First Technical Report, 1 May 1979-30 September 1979.
E. A. Sziklas, W. J. Fader, R. A. Jong, D. H. Polk, and J. H. Stufflebeam. Oct 79, 61p UTRC/R-79-954605
Contract AC02-79ET53087

The Plasma Stabilization Experiment is an effort to enhance stability in a mirror-confined plasma by stoppering cold ions with rf fields applied near the mirror throats. In this initial report period, primary and backup antennas were designed and fabricated. The primary pair was installed in the UTRC mirror facility and stabilization tests were initiated. In these initial tests rf power was applied to only one antenna at a time. Preliminary results indicate a stoppering effect at the mirror throat subjected to the rf and a simultaneous increase in the rate of decay of the confined plasma. These observations suggest the stoppering effect at one mirror throat is more than offset by an enhanced loss rate through the other throat. In the next test series rf power will be applied simultaneously in both mirror throats. (ERA citation 05:017197)

EUR-CEA-FC-977 PC **A03**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Kinetic Model for Non-Linear Mode Coupling of Trapped-Ion Instability.
M. Tagger, and R. Pellat. Oct 78, 32p
U.S. Sales Only.

A kinetic model is established for non-linear mode coupling of trapped-ion instabilities. It is based on a systematic expansion of Vlasov equation, applied to one (poloidal)-dimensional modes, and takes into account all important kinetic effects. Valid in the whole relevant range of physical parameters, it checks in the simplest case the results of Kadomtsev and Pogutse's four-fluid slab model. (Atomindex citation 10:489354)

FEI-789 MF **A01**
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.
Negative Atomic and Positive Molecular Ions in Low-Temperature Plasma.
V. E. Cherkovets. 1977, 16p
In Russian.
U.S. Sales Only. Microfiche copies only.

The composition of thermodynamically equilibrium plasma is investigated. The densities of negative atomic (a exp -) and positive molecular (m exp +) ions of cesium plasma depending on the temperature and pressure in the near-electrode space are determined. It was established that with increasing pressure and decreasing temperature the following components predominate in succession: electrons and atomic positive ions, electrons and positive molecular ions, positive molecular and negative atomic ions. From the point of view of reduction of losses ion production, realization of the second type of composition for (e,m exp +) is advantageous. The expressions for a near-electrode potenti.al jump both in the case of thermodynamic equilibrium and during current passage were obtained with due regard for m exp + and a exp - . On the basis of the peculiarities of the temperature dependence of the potential jump it appears to be possible to determine the work function of the electrode and some energy characteristics of atoms and molecules. (Atomindex citation 10:439123)

FOA-C-20303 PC **A03**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Magnetized Whirls in Plasma Focus Discharges.
E. Witalis. May 79, 30p
U.S. Sales Only.

The plasma focus is briefly described with emphasis on its capabilities as a neutron source. The filamentary whirl structures observed in the discharge plasma are described. Starting with a simple, early and particularly well established case of vorticity imparted by a rotational electric field to the plasma in MHD generators, a general derivation is then outlined proving that such magnetically induced rotation is a general feature for the normally Hall-conducting magnetized plasma. Physical interpretations of the effect are given and objections to it are critically reviewed as is also a theory proposing radiation cooling as the cause of plasma filamentation. A more detailed derivation based essentially on the consistent description of the motion and the

field generation of the charged plasma particles yields a theoretical model where the specific features of magnetically compressed plasmas are found. In particular, the ion collisionless skin depth is obtained as the key length parameter. This length is identified as roughly the whirl radius. In conjunction with a generalized Bennett relation theoretical whirl properties are predicted and found to agree with observations. Mechanisms that relate the whirls to nuclear fusion reaction conditions are tentatively indicated. (Atomindex citation 10:489378)

FUPH-R-157 PC **A02**/MF **A01**
Flinders Univ. of South Australia, Bedford Park. School of Physical Sciences.
Observation of the Reversed Current Effect.
I. R. Jones, and C. Silawatshananai. May 79, 15p
U.S. Sales Only.

The paper describes an observation of the reversed current effect, and its consequences, in a 'stabilized' Z-pinch. Magnetic probe measurements and holographic interferometry were used to follow the development of a reversed current layer and to pinpoint its location in the outer region of the pinched plasma column. The subsequent ejection of the outer plasma layer was observed using fast photography. (Atomindex citation 10:489212)

IAE-2836 MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Measuring Amplitude-Angular Distributions of the Langmuir Noises Appearing in a Plasma During Oncoming Magnetic Field Annihilation.
A. I. Zhuzhunashvili, and E. A. Oks. 1977, 28p
In Russian.
U.S. Sales Only. Microfiche copies only.

An optical method for measuring amplitude-angular distributions of the HF Langmuir turbulence is described, based on polarization analysis of the Stark profiles of hydrogen spectral lines. The Langmuir turbulence level has been for the first time determined by this method. It is shown besides that annihilation of opposite magnetic fields on the surface corresponding to zero field intensity is liable to generate a plasma layer with a maximum density. It has been found that not only LF instabilities but also the Langmuir noise are developed in this layer. Analysis of the experimental data shows that: 1) the effects associated with plasma inhomogeneity did not have tangible effect on the spectral line profiles detected; 2) the Langmuir noise fields are oriented in the "current-magnetic field"plane tangential to the plasma layer. (Atomindex citation 10:434791)

IAE-2858 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Effect of a Particle Source on the Nonlinear Evolution of a Monochromatic Wave.
A. B. Mikhailovskii, and A. I. Pyatak. 1977, 10p
In Russian.
U.S. Sales Only.

The influence of a resonance particle source on the nonlinear monochromatic wave in plasma is investigated. The cases of the Langmuir frequency in the absence of the magnetic field and the Alfven wave in toroidal geometry of the magnetic field are considered. It is shown that in the presence of the particle source a systematic change of the nonlinear wave amplitude takes place. It is supposed that this effect can be important in the case of fast neutral atom injection into magnetic traps and also for tasks of fast alpha -particles formed in plasma in thermonuclear reactions and for tasks of fast particle fluxes in the Earth magnetosphere. (Atomindex citation 10:419669)

IAE-2859 MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Alfven Wave Excitation by Fast Particles in Adiabatic Traps with a Finite Pressure Plasma.
B. I. Meerson, A. B. Mikhailovskii, and O. A. Pokhotelov. 1977, 12p
In Russian.
U.S. Sales Only. Microfiche copies only.

Studied is the Alfven wave excitation by fast particles in a finite pressure plasma in a longitudinal nonuniform magnetic field. On the basis of the Vlasov kinetic equation the dispersion equation, describing the low frequency Alfven oscillation, is derived. The relationship obtained describes the Alfen wave amplification on account of effects of plasma compressibility in the wave field. The latter is explained by the magnetic field line curvature and by the finiteness of the Larmor fast particles radius. The instability stabilization on trapped particles on account of finite pressure was found. It was established, that bounce-resonance determines the increment oscillations depending on frequency. The results obtained may be used to ensure the appearance of a descreet spectrum of geomagnetic pulsations. (Atomindex citation 10:419668)

IAE-2878 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
High-Pressure Plasma Stability in the Axial Region of Toroidal Traps.
Kh. D. Aburdzhaniya, and A. B. Mikhailovskii. 1977, 15p
In Russian.
U.S. Sales Only.

The local hydromagnetic stability of the near-axis region of a high-pressure plasma confined in toroidal traps of near-circular section with an arbitrary shape of the magnetic axis was investigated. For this purpose equations for the triangularity of magnetic surfaces, and also for the shift of the magnetic surfaces with an accuracy to the fifth order in pressure were obtained. The criterion for the local stability of the near-axis plasma region was derived and then used to investigate the stability of a tokamak with a modulated curvature of the magnetic axis. It is shown that at some resonance values of the safety factor the presence of the second harmonic of the Fourier expansion of the curvature destabilizes the high-pressure plasma in a tokamak. (Atomindex citation 10:434496)

IAE-2918 PC **A02**/MF **A01**
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii.
Two-Dimensional Flows of Relativistic Electrons.
A. V. Gordeev. 1977, 13p
In Russian.
U.S. Sales Only.

A set of two-dimensional equations describing the flow of relativistic electrons in a cylindrical geometry with azimuthal symmetry was obtained within the framework of the hydrodynamic approximation. The equations obtained hold both for electron flows in vacuum coaxial lines and during propagation of electron beams through plasma under conditions of electric neutralization. In the latter case, partial magnetic neutralization associated with variation in a magnetic field due to finite conductivity is also taken into consideration. (Atomindex citation 10:439174)

IAE-3000 PC **A02**/MF **A01**
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii.
Effect of Runaway Electrons on the Impurity Ion Multiplicity Distribution in a High-Temperature Plasma on the Joule Heating.
V. S. Marchenko, and S. I. Yakovlenko. 1978, 17p
In Russian.
U.S. Sales Only.

Investigated is the influence of non-maxwell energy distribution function of electrons on ionization state of impurities (i.e. impurity ion distribution according to ionization multiplicity) and on the luminescence intensities of impurity ion resonance lines. Recieved was the simple model function of electron distribution in the completely ionized plasma placed in the uniform electric field to average the ionization sections. Revealed were the values of electric field strength at which the non-maxwellness of distribution fucntion changes essentially the multiplicity distribution of ions. Stated is the possibility of appearing of some errors during the diagnosis of the concentration of impurities and their fluxes, due to the fact that the Maxwell distribution electron disturbances are not taken into account. (Atomindex citation 10:439234)

IAE-3052 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Stability of High-Pressure Plasma in a System with a Spatial Magnetic Axis.
V. M. Glagolev, and A. E. Leneva. 1978, 20p
In Russian.
U.S. Sales Only.

The paper gives calculations of hydromagnetic plasma instability confined in a solenoid with a spatial magnetic axis relatively to the localized disturbances of the Merse type. The plasma is supposed to be confined inside ideally conductive casing, having the same form as the magnetic surface limiting plasma (separatrix). Determined is the optimal casing shape with which the maximal value beta constitutes 0.3-0.4 according to the conditions of balance and stability of plasma. It is shown that with optimal casing shape there are no additional local plugs in the distribution of the magnetic field promoting increase of transfer coefficients in closed systems. (Atomindex citation 10:489169)

IAE-3057 MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Plasma Density Distribution in an Adiabatic Trap with Neutral Beam Injection.
S. V. Putvinskij, and Yu. A. Tarabrin. 1978, 12p
In Russian.
U.S. Sales Only. Microfiche copies only.

Proposed is the method of solution of the drift kinetic equation for the ion distribution function, allowing to regard to a magnetic field and a neutral atom beam real geometry in the problem of plasma accumulation in a trap. The results of numerical calculations of ion distribution function, created by a plasma source in the trap are presented along with those of the plasma density space distribution formed as a result of neutral atom beam injection into the trap with a quadrupole magnetic field of a "baseball" type. It is shown that if the ion distribution function of plasma is not washed out too quickly by cyclotron low-frequency oscillations, the drift-cone instability in the above trap will be stabilized. (Atomindex citation 10:489309)

IC-77-157 MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Generalized Magnetic Rosenbluth Potentials.
M. H. A. Hassan. Dec 77, 17p
U.S. Sales Only. Microfiche copies only.

It is shown that the coefficients of friction and diffusion of the magnetized Balescu-Lenard equation describing the interaction of ion test particles with electron field particles can be derived from two scalar potentials, which reduce to the potentials derived previously when wave effects are neglected. The parts of the potentials describing "wave effects" are evaluated explicitly in the case of Maxwellian electrons and the results are compared with the unmagnetized Rosenbluth potentials. The correction is dominant when eta= omega sub(e)/ omega sub(e)(>)1. (Atomindex citation 09:415675)

IC-77-48 PC **A02**/MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Generalized Rosenbluth Potentials.
M. H. A. Hassan. May 77, 14p
U.S. Sales Only.

It is shown that the coefficients of friction and diffusion of the Balescu-Lenard equation can be derived from two "generalized Rosenbluth potentials", which reduce to the standard Rosenbluth potentials if wave effects are neglected. The potentials are evaluated explicitly in the case of Maxwellian field particles. The dominant contribution of wave effects to the potentials is due to the interaction of electron field particles with ion sound waves. (Atomindex citation 10:434611)

INIS-mf-4680 PC **A02**/MF **A01**
Sydney Univ. (Australia). School of Physics.
Wills Plasma Physics Department Thirty-Fifth 6-Monthly Progress Report, January 1 to June 30, 1978.
Jul 78, 9p

U.S. Sales Only.

Progress is reported on research programs which are proceeding in the following areas: plasma sources, hydromagnetic shock waves, rotating plasmas, magnetohydrodyamics, laser diagnostics, and far infrared interferometry. (Atomindex citation 10:424601)

INIS-mf-4747 PC **A08**/MF **A01**
Akademiya Navuk BSSR, Minsk. Inst. Teplo- i Massoobmena.
Physics and Techniques of Low-Temperature Plasma.
1977, 166p
U.S. Sales Only.

Abstracts for each paper have been entered into the data base. (ERA citation 05:007853)

INIS-mf-4833 PC **A02**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Preliminary Results of Experiments with Moderate Power REB.
V. K. Rohatgi, S. K. Iyyengar, and K. C. Mittal.
1978, 2p
U.S. Sales Only.

No abstract available.

IPP-4/169 PC **A03**/MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).
Lower-Hybrid Wave Absorption in the Presence of Simultaneous Density and Magnetic Field Gradients.
S. Puri. Jun 78, 26p
U.S. Sales Only.

It is shown that for the lower-hybrid wave (the slower of the two cold-plasma modes propagating at an angle to the static magnetic field), the WKB requirements are satisfied in almost the entire region from the antenna upto and including the ion-cyclotron-harmonic resonance. Expressions for the electric field and the energy density in the WKB approximation are derived. Both the collisionless and collisional damping become significant near the resonance and the wave attenuation due to the two processes is estimated. From the differential equation for the electric field valid near the resonance, it is found that the wave energy would be completely absorbed even in the absence of a damping mechanism. The effect of impurities, although negligible near the plasma edge, becomes important following wave conversions and a significant fraction of the wave energy may end up heating the impurity ions in the plasma interior. The implications of using the 'local' dielectric tensor approximation in the above context are examined. (Atomindex citation 10:439269)

IPP-6/171 MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).
Linear Theory of Drift-Tearing and Interchange Modes in a Screw Pinch.
C. Copenhaver. Apr 78, 30p
U.S. Sales Only. Microfiche copies only.

A drift dispersion relation, as applied to a resistive incompressible plasma in a screw pinch, is derived. This dispersion relation incorporates both drift-tearing and drift-interchange modes and is valid throughout the collisional regime by including kinetic theory factors. The dispersion relation reduces to the drift-tearing dispersion relation in the zero pressure gradient limit, and to the classical resistive dispersion relation in the zero drift limit. The electron temperature gradient instability is still present. Now, however, the introduction of the interchange-drift instability increases the growth rate further above the tearing-drift case. (Atomindex citation 10:419622)

IPP-6/174 PC **A02**/MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).
Nonlinear Quenching of Diamagnetic and Gyroviscous Effects in Tearing Modes.
D. Biskamp. Jul 78, 22p
U.S. Sales Only.

The nonlinear behavior of the drift-tearing instability is investigated within the two fluid theory. It is shown analytically and verified in numerical computations that the diamagnetic effects and ion gyroviscosity which determine the frequency of the linear mode are quenched at magnetic island size of the order of the resitive layer width. For finite island width, growth and saturation of the mode depend only on resistivity and current profile, while its frequency is determined by the rotation of the plasma. (Atomindex citation 10:424465)

IPPJ-341 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Randomly Transitional Phenomena in the System Governed by Duffing's Equation.
Y. Ueda. Jun 78, 19p
U.S. Sales Only.

This paper deals with turbulent or chaotic phenomena which occur in the system governed by Duffing's equation, a special type of 2-dimensional periodic systems. By using analog and digital computers, experiments are undertaken with special reference to the changes of attractors and of average power spectra of the random processes under the variation of the system parameters. On the basis of the experimental results, an outline of the random process is made clear. The results obtained in this paper will be applied to the phenomena of the same kind which occur in 3-dimensional autonomous systems. (Atomindex citation 10:489365)

IPPJ-345 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Topics on Solitons in Plasmas.
Y. H. Ichikawa. Jul 78, 45p
U.S. Sales Only.

Solitons can be regarded as "nonlinear normal modes", in terms of which dynamical properties of a given physical system could be analyzed. The author, however, points out firstly that the cnoidal wave is also the genuine nonlinear wave playing important roles in nonlinear phenomena in plasmas and other dispersive media. Explicit analysis for the ion acoustic cnoidal wave is carried out up to the second order on the basis of Kodama-Taniuti's renormalized reductive perturbation theory. The nonlinear ion flux associated with the cnoidal wave is shown to have different dependence on the wave amplitude in compared with the quasi-linear ion flux. At the same time, it should be noticed that the nonlinear ion flux exhibits also profound frequency dependence, which is not predicted by the quasi-linear treatment. Secondly Bogoliubov-Mitropolsky perturbation analysis of the perturbed envelope soliton is briefly discussed in referring to Karpman-Maslov's perturbation approach based on the inverse scattering method. Thirdly, brief summaries on plasma waves in magnetized plasmas are followed by a report on the new inverse scattering scheme for the derivative nonlinear Schroedinger equation. In concluding remark, the potential importance of researches on solitons in strong plasma turbulence has been emphasized. (Atomindex citation 10:489199)

IPPJ-357 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
'Paramagnetism' of the Plasma in the Radio-Frequency Field.
Y. Ohsawa, M. Inutake, T. Tajima, T. Hatori, and T. Kamimura. Oct 78, 34p
U.S. Sales Only.

We investigate response of a plasma to an external rf magnetic field with frequency omega near the local ion cyclotron frequency and which is applied perpendicular to a static magnetic field. "Paramagnetism" is demonstrated by both computer simulation and experiment, when omega < omega sub(m), omega sub(m) being the eigen-frequency of shear Alfven, ion cyclotron or electrostatic ion cyclotron mode. By the paramagnetism we mean a situation that amplitude of rf magnetic field in the plasma is larger than that of rf field in the absence of plasma. The range omega < omega sub(m) is of interest concerning rf plugging and homogeneous rf heating of plasma. (Atomindex citation 10:489290)

IPPJ-359 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Complementary Variational Principles on Electrical Conductivities of a Plasma in a Uniform Magnetic Field.
S. Kaneko. Nov 78, 20p
U.S. Sales Only.

Several functionals, whose Euler-Lagrange equations are the kinetic equations for the velocity-distribution functions, are derived. The extremal values of these functionals are proved to be proportional to the Ohm conductivity exp + sup(i) or to the Hall conductivity exp + sup(i i). The complementary variational principles for exp + sup(i) and exp + sup(i i), which give both lower and upper bounds, are derived by use of these functionals. These principles are applied to a plasma composed of electrons and singly charged positive ions. The results of computations by use of simple trial functions show that the complementary variational principles derived in this paper are very useful. (Atomindex citation 10:489217)

JEN-404 PC **A02**/MF **A01**
Junta de Energia Nuclear, Madrid (Spain).
Self-Similar Motion of Laser Half-Space Plasmas. 2.Thermal Wave and Intermediate Regimes.
J. R. Sanmartin, and A. Barrero. 1978, 21p
U.S. Sales Only.

The one-dimensional self-similar motion of an initially cold, half-space plasma of electron density n sub(0), produced by the (anomalous) absorption of a laser pulse of irradiation phi = phi sub(0)t/tau(0(<)t(<=)tau) at the critical density n sub(c), is considered; the analysis, which allows for electron heat conduction and ion-electron energy exchange, involves three dimensionless numbers: epsilon identical to n sub(c)/n sub(0) assumed small, Z sub(i) (ion charge number), and a parameter alpha varies as (nsub(0)sup(2)tau/phisub(0))sup(2/3). For alpha(<<)1 a weak discontinuity develops, separating a thermal wave (where convection is negligible) moving into the undisturbed plasma, from a much thinner isothermal flow expanding into the vacuum. For 1(<<)alpha(<<)epsilonsup(-4/3) there is an isentropic compression flow between a shock, blounding the undisturbed plasma, and a very thin transition layer bounding an expansion flow, much larger in extent than the compression region. In both regimes the critical plane lies far in the expansion tail. The results break down when the density is so small that the plasma becomes collisionless. The analysis is also invalid for alpha too small. Using results previously found for alpha(>>)epsilon sup(-4/3), a qualitative discussion of how plasma behavior changes with alpha, is given. (Atomindex citation 10:419696)

KFTI-77-14 PC **A03**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Bibliography on the Stochastic Processes in Plasma and Related Problems. Issue 7. (3001-3500 Items).
R. V. Polovin. 1977, 36p
In Russian and English.
U.S. Sales Only.

The bibliographic index on the stochastic processes in plasma and related problems embraces 500 titles of papers published primarily in the 70-ies all over the world. The majority of papers deals with trapped particles, nonlinear waves in plasma, linear and nonlinear fluctuations. (Atomindex citation 10:419689)

KIYI-77-16 MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Teoreticheskoi Fiziki.
Nonlinear Wave Amplification in Electpon Beam-Plasma System.
V. P. Pavlenko. 1977, 20p
In Russian.
U.S. Sales Only. Microfiche copies only.

The nonlinear amplification of explosive type waves is investigated in plasma electron beam system provided that the wave number values of the interacting high frequency waves are in resonance region. For a weak wave coupling the amplification is shown to be enhanced as compared with the case of a usual explosive amplification occuring in nonresonance region. The obtained self-

similar solutions demonstrate that the wave amplitudes grow more steeply and the characteristices amplification length decreases essentially. (Atomindex citation 10:434693)

Rijnhuizen-77-107 PC **A02**/MF **A01**
Stichting voor Fundamenteel Onderzoek der Materie, Jutphaas (Netherlands). Inst. voor Plasma-Fysica.
MHD-Equilibrium of Weakly Ellipto-Toroidal Plasma Columns in Force-Free Fields.
W. Schuurman. Dec 77, 24p
U.S. Sales Only.

In this report ideal MHD-equilibrium configurations on toroidal plasma columns are considered. The sharp boundary model is chosen and the equilibrium equations are solved by a series expansion in the inverse aspect ratio of the metal enclosure. It is argued that calculations are comparatively simple by the use of Kadomtsev-Pogutse coordinates, which are extended to second order. Explicit formulae are derived for the ellipticity of a plasma column surrounded by a vacuum or by a tenuous plasma in a magnetic field with a constant pitch. The dependence of the toroidal shift and the ellipticity on the compression ratio and the poloidal beta is discussed. (Atomindex citation 10:419702)

Rijnhuizen-78-108 MF **A01**
Stichting voor Fundamenteel Onderzoek der Materie, Jutphaas (Netherlands). Inst. voor Plasma-Fysica.
Study of Equilibrium and Stability of High-beta Tokamaks Surrounded by Force-Free Fields.
D. A. D'Ippolito, J. P. Freidberg, J. P. Goedbloed, and J. Rem. Mar 78, 120p
U.S. Sales Only. Microfiche copies only.

The sharp-boundary model of ideal magnetohydrodynamics is presented in a form readily applicable to axisymmetric, high- beta plasmas of arbitrary cross-section. The usual vacuum region outside the plasma is replaced here by a layer of force-free currents, and the influence of force-free currents and cross-sectional shaping on the critical beta is studied. Specific results are given for circular, elliptical and racetrack-like cross-sections. A new parameter q* is introduced in place of the Mercier q, and it is shown that q* approximately 1 is a reasonable estimate of the toroidal current limitation due to external kink modes in high- beta plasmas with noncircular cross-sections. (Atomindex citation 10:419624)

Rijnhuizen-78-109 PC **A02**/MF **A01**
Stichting voor Fundamenteel Onderzoek der Materie, Jutphaas (Netherlands). Inst. voor Plasma-Fysica.
Measurement of Microwave Spectra from a High-Density Toroidal Discharge with Current-Driven Turbulence.
H. W. H. Van Andel. Mar 78, 7p
U.S. Sales Only.

Microwave radiation measurements in the region omega sub(pi) < < omega < omega sub(ce) in a high-density (omega sub(pe) > > omega sub(ce)) tokamak with turbulent skin heating show evidence of a Cerenkov beam-plasma instability during the first few microseconds of the heating pulse. It is proposed that the instability is caused by the interaction of populations of freely accelerated electrons with the bulk of the plasma, and corresponds to the unstable propagation of oblique whistlers along group-velocity resonance cones. Measured microwave spectra and their interpretation are presented. (Atomindex citation 10:419716)

TRITA-PFU-78-04 MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Institutionen foer Plasmafysik med Fusionsforskning.
Stability Aspects of Plasmas Penetrated by Neutral Gas with Respect to Velocity Driven Modes.
D. Ohlsson. Aug 78, 40p
U.S. Sales Only. Microfiche copies only.

A study of the stability properties of dense partially ionized plasmas immersed in strong magnetic fields with respect to velocity driven modes are presented. First we consider modes driven by mass motion perpendicular to the lines of force and the unperturbed density and temperature gradients. The presence of a third fluid, neutral gas, gives under certain conditions rise to unstable modes. This type of instability arises independently or whether the applied electric field transverse to the lines of force, driving the mass motion, being parallel or antiparallel to the unperturbed density and temperature gradient. The presence of neutral gas also corresponds to stabilizing effects which, in certain parameter regions, result in a quenching of this instability. It is shown that modes driven by velocity shear perpendicular to the lines of force are effectively stabilized by viscous and resistive effects. These effects are in certain parameter ranges strongly enhanced on account of plasma-neutral gas interaction effects. In collisionless plasmas, modes driven by velocity shear parallel to the lines of force are stabilized by compressibility effects parallel to the magnetic field and by finite Larmor radius effects. (Atomindex citation 10:434684)

TRITA-PFU-79-06 PC **A03**/MF **A01**
Royal Inst. of Tech., Stockholm (Sweden). Institutionen foer Plasmafysik med Fusionsforskning.
Fast Magnetosonic Wave Spectrum in a Transversely Magnetized Plasma Cavity.
M. Bures. Apr 79, 33p
U.S. Sales Only.

The fast magnetosonic wave spectrum is calculated for a transversely magnetized plasma cavity, including the symmetric as well as the nonsymmetric mode spectrum. The calculations serve as a theoretical model for the INTRAP-devices with a poloidal static magnetic field. The influence of a nonuniform density and of vacuum layers at the plasma boundary on the wave spectrum is discussed. It is shown that in the case of high plasma density a great number of magnetosonic modes lie below omega sub(ci). The influence of the density profile is to shift the frequencies of the modes towards the higher values and to introduce the Alfven resonant layers inside the plasma. The consideration of the finite axial wave numbers encreases the number of modes very rapidly. Finally it is shown that the important frequency shift of of the mode frequencies is caused by the influence of the boundary vacuum layers. (Atomindex citation 10:489120)

UCRL-83596 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Theoretical View of the Plasma Focus.
S. Maxon. 1 Feb 80, 5p CONF-800409-2
Contract W-7405-ENG-48
International conference on plasma physics, Nagoya, Japan, 7 Apr 1980.

The present theory of the plasma focus device is discussed. Experiments at low pressure clearly show a disruption of the current sheath and the formation of energetic electron and ion beams in a turbulent medium. Possible directions for calculations to explain this conversion of magnetic energy into charged particle beams are indicated. (ERA citation 05:017192)

20J. Quantum Theory

AD-A083 813/6 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
The Boltzmann Equation with a Soft Potential. Part II. Nonlinear, Spatially-Periodic.
Technical summary rept.,
Russel Caflisch. Jan 80, 28p Rept no. MRC-TSR-2031
Contract DAAG29-75-C-0024, Grant NSF-MCS78-09525
See also Part 1, AD-A079 706. Sponsored in part by Grant NSF-MCS76-07039.

The results of Part I are extended to include linear spatially periodic problems - solutions of the initial value are shown to exist and decay like exp(-lambda (t to the beta power)). Then the full nonlinear Boltzmann equation with a soft potential is solved for initial data close to equilibrium. The nonlinearity is treated as a perturbation of the linear problem, and the equation is solved by iteration. (Author)

IC-77-34 PC **A02**/MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Coupled Gravitational and Electromagnetic Perturbation Equations with the Source Terms.
C. H. Lee. Apr 77, 13p
U.S. Sales Only.

Coupled gravitational and electromagnetic perturbation equations in the Kerr-Newman background geometry are supplemented with the source terms. Then, restricting to the Reissner-Nordstroem case, the radial equations are derived. The asymptotic solutions at infinity are discussed in connection with the spin polarizations. (Atomindex citation 10:434188)

IC-77-43 MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Massive Supergravity from Spontaneously Breaking Orthosymplectic Gauge Symmetry.
A. M. Chamseddine. May 77, 25p
U.S. Sales Only. Microfiche copies only.

A Lagrangian density is constructed which is manifestly invariant under the orthosymplectic gauge group OSP(1;4) and under general co-ordinate transformations. This is done by the use of two multiplets, the symmetric and antisymmetric representations of OSP(1;4). The general features of OSP(m;2n) and in particular its irreducible representations are presented. The absence of OSP(1;4) symmetry from the ground state implies that one of the scalar fields, which is an element of the symmetric multiplet, has a non-vanishing vacuum expectation value. A shift on the fields reveals the physical spectrum of the Lagrangian. Two Goldstone fields are present, a vector and a spinor, corresponding to the breakdown of OSP(1;4) to the Lorentz group. The full Lagrangian contains a graviton, a massive spin-3/2 field and two massive scalar fields. The generalization to OSP(2;4) is immediate. (Atomindex citation 10:434099)

IC-77-55 MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Gauging the Graded Conformal Group with Unitary Internal Symmetries.
S. Ferrara, P. K. Townsend, M. Kaku, and P. Nieuwenhuizen Van. Jun 77, 13p
U.S. Sales Only. Microfiche copies only.

Gauge theories for extended SU(N) conformal supergravity are constructed which are invariant under local scale, chiral, proper conformal, supersymmetry and internal SU(N) transformations. The relation between intrinsic parity and symmetry properties of their generators of the internal vector mesons is established. These theories contain no cosmological constants, but technical problems inherent to higher derivative actions are pointed out. (Atomindex citation 10:434130)

IC-77-61 MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Bundle-Separation of Singularities in Paralleizable Spacetimes.
C. T. J. Dodson. Jul 77, 5p
U.S. Sales Only. Microfiche copies only.

The Schmidt bundle-completion for a spacetime may be non-Hausdorff, as for example in Schwarzschild and Friedmann cases. A modification of the Schmidt procedure is described; it appears to be useful in avoiding fibre degeneracy over singularities and thereby promoting a Hausdorff completion. (Atomindex citation 10:434117)

IC-77-62 MF **A01**
International Centre for Theoretical Physics, Trieste (Italy).
Massive Supergravity from Non-Linear Realization of Orthosymplectic Gauge Symmetry and Coupling to Spin 1/2- Spin-1 Multiplet.
A. H. Chamseddine. Jul 77, 14p
U.S. Sales Only. Microfiche copies only.

A Lagrangian density is constructed manifestly invariant under OSP(1;4) gauge symmetry and general co-ordinate transformations, and broken spontaneously to the Lorentz symmetry. The non-

linear transformations of the Goldstone fields are obtained by using a constrained linear representation that contains these fields. The resulting Lagrangian is the usual massive supergravity Lagrangian when written in the unitary gauge. It is proved explicitly that the supersymmetric Higgs effect is occurring. Finally, a gauge-invariant matter Lagrangian for a massive spin-1/2-spin-1 multiplet is presented. (Atomindex citation 10:434098)

IFUSP-P-151 PC **A02**/MF **A01**
Sao Paulo Univ. (Brazil). Inst. de Fisica.
Weak Quantization in a Non-Perturbative Model.
G. G. Emch, and K. B. Sinha. Jul 78, 16p
U.S. Sales Only.

The concepts of extended operator convergence and of spectral concentration are used to study rigorously a class of simple models for the tunnel effect and the laser. We compute exactly the asymptotic decay times of the eigenmodes, and we prove their link with the line-width of the corresponding resonances. (Atomindex citation 10:431193)

JINR-E-17-11408 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Quasi-Uniform Topologies on Local Observables.
G. Lassner. 1978, 19p
U.S. Sales Only.

Quasi-uniform topologies on algebras of local observables are introduced. For the BCS-model it is shown that with the help of these topologies one gets a completion of the algebra of local observables on which the dynamics is given by a one-parameter group of transformations. (Atomindex citation 09:409908)

JINR-E-2-11702 MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Structure of a Supergravity Group.
V. Ogievetsky, and E. Sokatchev. 1978, 11p
U.S. Sales Only. Microfiche copies only.

The supergravity group is found to be the direct product of general covariance groups in complex conjugated left and right handed superspaces. The ordinary space-time coordinate and the axial gravitational superfield are the real and imaginary parts of the complex coordinate, respectively. It is pointed out that a number of questions concerning the formalism remains open. For instance how to define superfields with external indices, supercovariant derivatives and invariants of the group, etc. However, the extremely simple and clear geometrical picture of the supergravity group given here will provide an adequate basis for the supergravity theory. (Atomindex citation 10:434215)

JINR-R-2-11514 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
General Relationship Between Linear and Non-linear Realization of Supersymmetry.
E. A. Ivanov, and A. A. Kapustnikov. 1978, 19p
CONF-780826-33
In Russian.19. conference on high energy physics, Tokyo, Japan, 23 Aug 1978.
U.S. Sales Only.

The close correspondence between the superfield approach to the supersymmetry and the Volkov-Akulov nonlinear realization is established. It is shown that any superfield, by certain field-dependent change of variables x sub(mu), theta sub(alpha), can be transformed to the form in which it is represented by nonlinearly transforming components. Inversely, there always exist the functions of the nonlinear realization objects which transform according to the linear supertransformation law. General theorems and explicit formulas are derived. They describe the transition from the linear realization to the nonlinear one and vice versa. (Atomindex citation 10:434171)

KFTI-77-41 MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Ballistic Experiment with Photons of Synchrotron Radiation.
P. I. Gladkikh, A. S. Mazmanishvili, L. V. Reprintsev, and R. I. Filippov. 1977, 17p
In Russian.
U.S. Sales Only. Microfiche copies only.

The experimental verification of the second postulate of the special relativity theory (constancy of c) is presented. The experimental techniques described are given. The results of direct measurements of the propagation velocity of the relativistic electron synchrotron radiation in the storage ring and comparison of times of flight of the synchrotron radiation photons under conditions of atmospheric pressure and high vacuum. The measurement results do not agree with the ballistic hypothesis of light propagation, but correspond to the second postulate of the special relativity theory. (Atomindex citation 10:434150)

PB80-177975 Not available NTIS
National Bureau of Standards, Washington, DC.
Infrared Radiation in Potential Scattering.
Final rept.,
L. Rosenberg. Jan 80, 6p
Pub. in Journal of Physics Review A 21 n1 p157-162 Jan 80.

Some time ago Bloch and Nordsieck, working in a model in which the spectrum of the radiation field is cut off beyond some low frequency omega(l), showed that the transition probability for scattering, summed over final photon states, is approximately that which would be obtained if the interaction of the projectile with the radiation field were neglected entirely. Here, within the context of a nonrelativistic treatment of the scattering process, the sum rule is generalized through the inclusion of corrections of first order in omega(l). These corrections can be interpreted in terms of a simple classical picture. In the course of the derivation, a low-frequency approximation for the transition amplitude is obtained which contains as special cases the perturbative result of Low for single-photon bremsstrahlung and the more recently derived approximation for scattering in a low-frequency laser field.

USIP-78-13 PC **A03**/MF **A01**
Stockholm Univ. (Sweden). Institutionen foer Teoretisk Fysik.
Parametrized Post-Newtonian Formalism in Schwarzschild Coordinates.
A. Karlhede. Sep 78, 27p
U.S. Sales Only.

The usual PPN-formalism uses isotropic coordinates. We develop a PPN-formalism in Schwarzschild coordinates. This gives a linear metric for general relativity while the "isotropic" metric contains non-linear terms. It is shown that the post-Newtonian metric can be made linear for any theory of gravity by a suitable choice of coordinates. This shows that non-linearities are not measurable on the post-Newtonian level. Finally, the explicit transformation from isotropic coordinates to the new coordinate system is obtained. (Atomindex citation 10:434177)

20K. Solid Mechanics

AD-A083 871/4 PC **A03**/MF **A01**
Army Armament Research and Development Command Watervliet NY Large Caliber Weapon Systems Lab
Stress Singularity at the Vertex of a Flat Wedge-Shaped Crack by a Variational Method.
Technical rept.,
M. A. Hussain, B. Noble, and S. L. Pu. Jan 80, 33p ARLCB-TR-80002, AD-E440 064
Presented at the ASME-CSME Applied Mech/Bioengineering Conf/Fluid Eng Conference, 18-20 Jun 79, Niagara Falls, NY and the MACSYMA Users Conference (2nd) 20-22 Jun 79, Washington, DC.

Three dimensional elasticity problems are generally complex. In this paper we present the analysis for the stress singularity at the apex of a three dimensional, flat, wedge-shaped crack under general loadings. The problem is reduced to a set of coupled dual integral equations. Because of the complexity they are not amenable to a closed form solution. A variational method is developed to handle such problems. The physical interpretation of the results is also presented.

N80-22752/3 PC **A02**/MF **A01**
Max-Planck-Institut fuer Stroemungsforschung, Goettingen (Germany, F.R.).
On the Asymptotic Theory of Plates.
G. Zimmermann. Jul 79, 23p MPIS-12/1979, ISSN-0436-1199

A mathematical formalism is developed which allows the elastic properties of plates to be described in three dimensions. The formalism makes use of an expansion in terms of a thickness parameter in order to arrive at approximate two dimensional plate equations. The existence of a format solution is discussed and confirmed by using Fourier transformations.

20L. Solid-State Physics

AD-A083 650/2 PC **A02**/MF **A01**
Rutgers - the State Univ Piscataway NJ High Pressure Materials Research Lab
Ferroelectric Hysteresis Effects in Poly (Vinylidene Fluoride) Films.
J. I. Scheinbeim, C. H. Yoon, K. D. Pae, and B. A. Newman. 1 Apr 80, 25p Rept no. TR-20
Contract N00014-75-C-0540

Investigations of the piezoelectric response of biaxially oriented poly (vinylidene fluoride) films subjected to a series of static positive and negative poling fields produces a hysteresis curve for d31 and e31 showing the ferroelectric character of phase IV. Examination of changes in the crystalline regions, using differential scanning calorimetry and x-ray methods, of films cycled (statically) through large positive and negative poling fields, provides insight into the switching mechanisms of both phase I and phase IV. The experimental results show a cyclic broadening and narrowing of the endothermic melting peaks as the film polarization is switched. Cyclic changes in the intensities of the phase I (110) (200) and phase II (or phase IV) (100), (020), and (110) reflections are also observed. (Author)

AD-A083 655/1 PC **A02**/MF **A01**
Rutgers - the State Univ Piscataway NJ High Pressure Materials Research Lab
The Pressure Dependence of the Pyroelectric Response of Poly(Vinylidene Fluoride) Films.
Technical rept.,
J. I. Scheinbeim, K. T. Chung, K. D. Pae, and B. A. Newman. 1 Apr 80, 24p Rept no. TR-18
Contract N00014-75-C-0540

The pressure dependence of the pyroelectric coefficient, Py, was determined from atmospheric pressure to 7Kbar over a temperature range from -80 degrees C to +48 degrees C for poled, uniaxially oriented poly (vinylidene fluoride) film. The effect of the glass transition on Py as a function of pressure is compared to the pressure dependence of the glass transition temperature obtained from dielectric studies. The radio of d(p prime) the hydrostatic pressure piezoelectric coefficient, to Py is presented as a function of both temperature and pressure. The details of a high pressure system designed for these measurements are also presented. (Author)

AD-A083 728/6 PC **A05**/MF **A01**
Pacific-Sierra Research Corp Santa Monica CA
Survey of High-Pressure Effects in Solids.
Final rept. 21 May-30 Sep 79,
M. Sparks, L. J. Sham, and M. Ross. Nov 79, 90p Rept no. PSR-931
Contract MDA903-79-C-0395
Prepared in cooperation with California Univ., La Jolla, San Diego and California Univ., Livermore. Lawrence Livermore Lab.

The density-functional formalism is used as the framework within which to assess previous calculations and to suggest new avenues of research. As a result of the study, we judge that significant results should be obtained from theoretical high-pressure-physics investigations at one of three levels of sophistication: the Gordon-Kim-Boyer scheme with our suggested modifications; use of the exchange-correlation potential in the local-

density approximation in such an accurate band-structure calculation as the augmented-plane-wave, Korringa-Kohn-Rostoker, or linear-combination-of-muffin-tin-orbital methods; or a complete calculation of the electron dynamics in the local-density approximation, which would also be useful in calculating the phonon spectrum. This approach should yield good results for the equation of state, which is the required basis for studies of dynamic and nonlinear effects, structural transitions in insulators and semiconductors (possibly providing a microscopic understanding of the successful ionicity scale of Phillips), simple insulator-metal transitions, polymorphic transitions in metals, and mixed-valence salt transitions. The state of the art in experimental and theoretical high-pressure physics research is surveyed in the context of recent studies on iodine, xenon, and cesium. Ultra-high-pressure methods now under development are also reviewed. (Author)

AD-A083 758/3 MF **A01**
Missouri Univ-Rolla Dept of Physics
Optical Studies of the Interface States at GaAs-Metal Schottky Barrier Junctions.
Final rept. 1 Oct 75-29 Sep 78,
Robert J. Bell, Ralph W. Alexander, Jr., and Gerald P. Alldredge. 1980, 34p AFOSR-TR-80-0160
Grant AFOSR-76-2938
Availability: Microfiche copies only.

The goal of the proposed research was to study surface states at GaAs metal Schottky barrier junctions and the effects of oxygen exposure on the surface states using both optical and electrical measurements with the goal of correlating the optical and electrical results. The correlation could not be achieved because the optical measurements were unsuccessful in detecting the surface states. From the electrical measurements, the following results were obtained: oxygen-exposure before the metallization with Al produces a large increase in the surface density of states peaking about 0.28 eV above the Fermi level; Al-GaAs diodes metallized without oxygen exposure had ideality factors of n equal to less than 1.1; Ag-GaAs diodes with oxygen exposure also show a surface state density peaking about 0.3 eV above the Fermi level. However, the surface state density is considerably lower than for oxygen-exposed AlGaAs diodes; Au-GaAs diodes with oxygen exposure show a surface state density which peaks about 0.45 eV above the Fermi level. Again, this density is considerably lower; from the above, oxygen at a GaAs-metal interface plays an important role in determining the surface state density. The theoretical part of this study to calculate electronic energies at GaAs surface was also unsuccessful. (Author)

AD-A083 778/1 PC **A03**/MF **A01**
Rockwell International Thousand Oaks CA Electronics Research Center
High Resistivity Molecular Beam Epitaxial AlGaAs for Device Applications.
Annual rept. 1 May 78-30 Apr 79,
R. D. Fairman, D. L. Miller, and W. A. Hill. Feb 80, 45p Rept no. ERC41006.2AR
Contract N00014-78-C-0370

AlGaAs & GaAs molecular beam epitaxial (MBE) layers suitable for device application, are studied and the results are discussed. Analysis includes Van der Pauw and Hall measurements, photoluminescence, sheet resistance, photoinduced current transient spectroscopy (PITS), secondary ion spectroscopy, and capacitance-voltage profiling. All indications are that high quality buffer layers of AlGaAs and active layers of GaAs can be produced by MBE which can yield devices of exceptional performance. (Author)

AD-A083 799/7 PC **A03**/MF **A01**
Rockwell International Thousand Oaks CA Science Center
Growth of HgCdTe by Modified Molecular Beam Epitaxy (MBE).
Semi-annual technical rept. no. 2, 1 Sep 79-29 Feb 80,
J. T. Cheung. Mar 80, 33p Rept no. SC5202.6SA
Contract MDA903-79-C-0188, DARPA Order-3704

An investigation was made on the deposition of HgCdTe thin film on CdTe by irradiating the bulk source material with high power laser pulses. The morphological features and stoichiometric composition depend very strongly on the laser characteristics and the scanning rate. Under very high power operation, the dominant deposition process is the condensation of micron size molten globules 'blown-off' from the source material. At lower power level, the film formation is largely due to the deposition of small molecular clusters. Compositional analysis of the film showed that the CdTe end of the alloy evaporated congruently, whereas the HgTe and end suffered some loss of Hg. The amount of Hg loss could be reduced by varying the laser power and the scanning rate. n-type films up to 2 micron thick were deposited in this manner and photoconductive devices were fabricated and measured. We have also made a detailed mass spectrometric study of the evaporant composition under different conditions. A model on the evaporation mechanism formulated from such information will be discussed. (Author)

AD-A083 806/0 Not available NTIS
Virginia Univ Charlottesville Dept of Physics
Conference on Future Trends in Superconductive Electronics. Held at Charlottesville, Virginia, on March 23-25, 1978,
Hugh C. Wolfe, Bascom S. Deaver, Jr., Charles M. Falco, Jay H. Harris, and Stuart A. Wolf. 1978, 508p
Grant N00014-78-G-0020
See also AD-661 848.
Availability: American Institute of Physics, 335 East 45th St., New York, NY 10017, HC $22.00. (No copies furnished by DTIC/NTIS).

In 1967 a symposium entitled 'Physics of Superconducting Devices', sponsored by the Office of Naval Research, was held in Charlottesville at the University of Virginia to exchange ideas on techniques and devices made possible by the unique properties of superconductors, particularly, but not exclusively, ones based on the Josephson effects. This meeting was extremely successful and included some of the earliest discussion of SQUIDs, magnetometers, the voltage standard, the noise thermometer, devices based on thin film bridges, and Josephson devices as electromagnetic detectors and as possible computer elements. Now, eleven years later, SQUID magnetometers are commercial devices, enormous progress has been made toward practical high speed digital devices, and Josephson devices may be on the verge of competing usefully as detectors of electromagnetic radiation. It can be argued that superconducting devices have indeed emerged from the research laboratory and are becoming attractive candidates for use in electronic systems offering heretofore unavailable levels of precision, speed, sensitivity and low loss. The Conference on Future Trends in Superconductive Electronics addressed the interface between those who study and develop devices and those who design and produce practical electronic systems.

AD-A083 954/8 PC **A02**/MF **A01**
Yale Univ New Haven CT Dept of Engineering and Applied Science
Interaction between Localized Carriers in the Accumulation Layer and Extended Bulk LO Phonons in InSb and GaSb: Raman Interference Lineshapes,
Ralf Dornhaus, Roger L. Farrow, Richard K. Chang, and Richard M. Martin. 1979, 7p Rept no. TR-7
Contract N00014-76-C-0643
Pub. in Light Scattering in Solids, p299-305 1979.

No abstract available.

AD-A083 996/9 PC **A02**/MF **A01**
Rutgers - the State Univ New Brunswick NJ
Equipment Loan Contract for Low Temperature Research.
Letter rept. no. 3 (Final), 1 May 76-30 Apr 79,
Peter Lindenfeld. Apr 80, 15p
Contract N00014-76-C-1064

A summary is given of research in nuclear magnetic resonance, mixed valence compounds, superfluid helium 4, superfluid helium 3, thermal, magnetic and electrical transport properties of granular aluminum and electron paramagnetic resonance accomplished with the aid of helium gas supplied by this contract. (Author)

CEA-CONF-3927 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Grenoble (France). Lab. d'Electronique et de Technologie de l'Informatique.
Ion Implantation in Semiconductors and Other Materials.
G. Guernet, M. Bruel, J. P. Gailliard, M. Garcia, and J. Y. Robic. 10 Mar 77, 43p CONF-761109-1
In French.Materials and technologies for microelectronics, Montpellier, France, 23 Nov 1976.
U.S. Sales Only.

The evolution of ion implantation techniques in the field of semiconductors and its extension to various fields such as metallurgy, mechanics, superconductivity and opto-electronics are considered. As for semiconductors ion implantation is evoked as: a means of predeposition of impurities at low doping level (10 exp 11 to 10 exp 14 cm exp -2); a means for obtaining profiles of controlled concentration; a means of reaching high doping levels with using 'strong current' implantation machines of the second generation. Some results obtained are presented. (Atomindex citation 09:414740)

CEA-N-1994 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. d'Etudes des Combustibles a Base de Plutonium.
Irradiation Induced Creep in Whiskers of NaCl.
J. A. A. Khan. Sep 77, 47p
In French.Thesis.
U.S. Sales Only.

Whiskers of NaCl have been grown and irradiated under flexion by X-rays (approximately 2x10 exp 7 R/h) at room temperature and the residual curvature measured. Complete recovery of the initial form of the whisker within an hour's annealing at 400 exp 0 C proves clearly that the observed deformation (creep) is due to the presence of dislocation loops. The choice of NaCl extremely simplifies the experiment and its interpretation since X-rays create point defects one by one. Moreover, this mode of irradiation, at room temperature, produces a very simple situation: perfect interstitial dislocation loops and immobile point defects which are little influenced by the applied stress. The flexion leads to a stress system which hardly differs from an uniaxial stress. One can study separately the preferential nucleation of dislocation loops and their differential growth by carrying out an irradiation under stress followed by an irradiation without stress and vice versa. It is shown that the induced creep is mostly due to the preferential nucleation of dislocation loops and is little affected by the differential growth of these loops. The nucleation period of the loops is very short: a dose of approximately 10 exp -5 d.p.a. is largely sufficient for the quasi completion of dislocation loops in a crystal having an impurity concentration of approximately 10 exp -3 . (Atomindex citation 09:410826)

CONF-790248-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Introduction.
R. D. Westbrook. 1979, 4p
Contract W-7405-ENG-26
Lifetime in silicon symposium, San Diego, CA, USA, 15 Feb 1979.

Separate abstracts have been prepared for items within the scope of the energy data base. The symposium was designed to bring out current thinking and activity relating to carrier lifetimes in silicon. (ERA citation 05:017838)

CONF-791151-3 MF **A01**
Argonne National Lab., IL.
Layered Ultrathin Coherent Structures (LUCS).
I. K. Schuller, and C. M. Falco. 1979, 8p
Contract W-31-109-ENG-38
Inhomogeneous superconductors conference, Berkeley Springs, WV, USA, 1 Nov 1979.
Microfiche copies only.

A new class of superconducting materials, Layered Ultrathin Coherent Structures (LUCS) are described. These materials are produced by sequentially depositing ultrathin layers of materials using high rate magnetron sputtering or thermal evaporation. Strong evidence is presented that layers as thin as 10 A can be prepared in this fashion. Resistivity data indicates that the mean free path is layer

thickness limited. A strong disagreement is found between the experimentally measured transition temperatures T/sub c/ and the T/sub c/'s calculated using the Cooper limit approximation. This is interpreted as a change in the band structure or the phonon structure of the material due to layering or to surfaces. (ERA citation 05:017148)

DOE/ER/10382-1 PC **A03**/MF **A01**
General Electric Corporate Research and Development, Schenectady, NY.
Study of Local Atomic and Electronic Structure in Glassy Metallic Alloys. Progress Report, March 1, 1979-December 1, 1979.
R. P. Messmer, and J. Wong. 1979, 29p
Contract AC02-79ER10382

A summary of progress on Local Atomic and Electronic Structure in Glassy Metallic Alloys is given. A brief review of structure in metallic glasses is presented as a background. The experimental progress from our EXAFS studies during the past year is summarized. The theoretical progress from our molecular orbital cluster studies of electronic structure is discussed. (ERA citation 05:017840)

INS-TL-135 MF **A01**
Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study.
In-Depth Magnesium Film Composition Profiles by AES.
J. Tanaka, and S. Hagiwara. 17 Feb 78, 30p
U.S. Sales Only. Microfiche copies only.

For an approach to study the properties of thin film which is used as a target in nuclear physics, elemental concentration depth profiles of the evaporated film composed of Mg/C/TP/G structures are evaluated by Auger Electron Spectroscopy (AES) coupled with Ar exp + -ion sputter etching. It is recognized that O-components present in the C layer contributed to Mg oxidization in the initial stage of evaporation. By subsequent peeling oxidization was further enhanced in the bulk roughly at the same level as that at the Mg/C interface. From the investigated behaviors of the amorphous parting agent, Teepol (TP), the possibility of Mg films, being unbacked from Mg/C/G structures is suggested. Depth profiles of 33 eV (uncorrected) signal are thought to give support to the assumption, made by Janssen et al., concerning the Mg exp 2+ L/sub 2,3/O exp 2- L sub 1 MgV (interfacial) transition given to the corresponding peak at 27 eV. (Atomindex citation 09:409355)

IPNO-TH-77-20 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Percolation and Superconductivity in Ion-Implanted Aluminium Films.
F. Meunier, P. Pfeuty, A. M. Lamoise, J. Chaumont, and H. Bernas. 1977, 12p
U.S. Sales Only.

Ion implantation of Si and Ge in Al thin films at 8K produces alloys exhibiting enhanced superconducting transition temperatures (up to 8.35 K for Al sub 60 Si sub 40) and a metal-non metal transition at a volume concentration of 45%Si. These results are compared to those obtained by other authors on films prepared by evaporation on cold substrate. (Atomindex citation 09:409912)

IS-T-894 PC **A03**/MF **A01**
Ames Lab., IA.
Flux-Line-Cutting Threshold in Type-II Superconductors.
Y. C. S. Yeh. Mar 80, 50p
Contract W-7405-ENG-82
Thesis.

The stability of the vortex array in a slab geometry is analysed. Numerical calculations of the force exerted on a vortex in a perturbed array exhibit the existence of a threshold for flux-line cutting. For angles exceeding the critical value, the array is driven towards flux-line cutting for small perturbations. The critical angle gradient can be employed to express the threshold for flux-line cutting. (ERA citation 05:017146)

IS-T-895 PC **A03**/MF **A01**
Ames Lab., IA.
Superconductivity in the Lanthanum-Yttrium-Manganese Alloy System.
R. J. Stierman. Mar 80, 37p
Contract W-7405-ENG-82
Thesis.

An empirical approach involving lattice instabilities was investigated in the search for new superconducting materials. Pseudo-lanthanide compounds using La and Y were prepared for the system La/sub 1-x/Y/sub x/Mn sub 2 by arc melting and subsequent heat treatment. Low temperature magnetic susceptibility and low temperature heat capacity measurements were made. The unit cell lattice parameters were determined from x-ray powder patterns taken on most samples and metallographic examination was carried out on selected samples. Alloys with low La concentrations (x greater than or equal to 0.6) showed RMn sub 2 in the cubic C15 Laves phase as the major component with second phase material present. The magnetic susceptibility and x-ray data indicated a superconducting phase which seemed to be the RMn sub 2 phase, but heat capacity measurements showed the second phase material was the superconductor, while the RMn sub 2 was not. Failure to form compounds with higher La content was experienced and may be due to the lattice instability expected at x = 0.56. This indicates that perhaps more stingent conditions are required to form pseudo-lanthanide compounds than were previously considered. More systems should be investigated to see if this is true, and to determine the possibilities of this approach. (ERA citation 05:017149)

ISM-252 PC **A02**/MF **A01**
Ames Lab., IA.
Photoacoustic Detection Methods for Characterizing Laser Irradiation and Recrystallization of Semiconductors.
J. F. McClelland, and R. N. Kniseley. 1979, 7p
CONF-791173-1
Contract W-7405-ENG-82
Symposium on laser and electron processing of material, Cambridge, MA, USA, 27 Nov 1979.

The use of photoacoustic detection is discussed as a technique for monitoring laser heating and for characterizing implantation of recrystallization of semiconductors via optical absorption. Preliminary results are reported for laser heating of Ge. A method is proposed for signal processing to enable measurement of optical absorption coefficient changes due to implantation and recrystallization without a background signal from the unimplanted region of the semiconductor. (ERA citation 05:016133)

JINR-R-14-11111 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Programs for Finding Crystal Field Parameters to Interpret Inelastic Neutron Scattering.
V. Matts. 1977, 16p
In Russian.
U.S. Sales Only.

A method for finding crystal field parameters using only the energy values observed in an inelastic neutron scattering experiment on compounds containing rare-earth ions is described. The considerations are done for crystal fields of cubic orhexagonal symmetry. On the basis of this method computer programs for the special case of the Pr exp 3+ ion were written. (Atomindex citation 09:399621)

JINR-R-14-11324 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Determination of the Crystal Field Splitting of Pr exp 3+ in PrNi sub 5 by Means of Inelastic Neutron Scattering.
A. Andreeff, K. Walther, H. Griessmann, L. P. Kaun, and B. Lippold. 1978, 17p
In Russian.
U.S. Sales Only.

The results of experimental determination of crystal field splitting of Pr exp 3+ in PrNi sub 5 by means of inelastic neutron scattering are reported. Inelastic neutron scattering experiments were performed by the time-of-flight method at different temperatures of the target (T=85K and T=295K). For the determination of the phonon part of scattered neutron intensity we used the temperature dependence of phonon scattering in the form of Bose function. For the crystal field parameters we obtain x=0.7; y=0.41; W=1.04 meV. With these parameters the experimental heat capacity and the magnetic susceptibility can be reproduced in a satisfactory manner. (Atomindex citation 09:409282)

JINR-R-3-10072 MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Observation of Phase Transitions Induced by a Magnetic Field in a Pulsed Reactor.
V. V. Nitts, G. Rehpke, Z. Tukhazh, and A. A. Yakovlev. 1976, 18p
In Russian.
U.S. Sales Only. Microfiche copies only.

Measurements of neutron diffraction on a "thick" single crystal of hematite at temperatures below Morin point with the application of a pulsedd reactor and a pulse magnetic field have been performed. In the region of the first-order phase transition connected with the turn of the antiferromagnetic vector into the basal plane, for the magnetic field perpendicular to the rhombohedral axis, additional scattering is observed with an intensity comparable to the intensity far from the transition point. The increase of neutron intensity is explained as a result of diffraction on nuclei of the new phase. A theoretical analysis of the magnetic diffraction of neutrons on a single crystal containing a great number of thin new phase domains is presented. It is shown that the concentration of the new phase detected in the experiment is 2-6x10 exp -3 , and the thickness of the nuclei is 10 exp 2 -10 exp 3 A. The life time of the observable nuclei near the transition point is not less than 100 ms. (Atomindex citation 09:399627)

JINR-R-3-11986 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Choppering of Ultracold Neutron Flux by Magnetized Ferromagnetic Films.
M. I. Novopol'tsev, and Yu. N. Pokotilovskii.
1978, 8p
In Russian.
U.S. Sales Only.

The first results of the experiment on the chopping of ultracold neutron flux by means of a device containing the current foil and two ferromagnetic films are reported. The measurements have been performed in the stationary regime. 3 mu m thick permalloy films (50% iron - 50% nickel) have been used. The chopping effect for neutron flux appears at the transition of the current through the foil, magnetizing a films in opposite directions. The "open" state for neutron flux is produced by the magnetization of the films in the same direction by means of the outer magnetic field. At the foil axis, where the adiabatic reverse of the neutron spin is absent, the fivefold weakening of the neutron flux is obtained in the "closed" state in relation to the flux in the "open" state. The curves of chopping of ultracold neutrons on the whole area of current foil have been measured and compared with the calculations. Insufficiently high coefficient of chopping is explained by incomplete polarization of neutrons in transmission through each of the ferromagnetic films. The possible ways for improvement of efficiency of the chopper are indicated. (Atomindex citation 10:468231)

KFK-2630 PC **A05**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Angewandte Kernphysik.
Phonon Dispersion and Neutron Scattering Law S(K, omega) for a Quasi One Dimensionel Peierls System.
Diss. (D.Sc.),
K. Kaefer. Apr 78, 86p
In German.
U.S. Sales Only.

One-dimensional electron-phonon systems tend to develop pronounced 2kF-phonon anomalies. Under this aspect the phonon dispersion of a system of linear chains is microscopically calculated in this treatise. The chains are in the Peierls phase, i.e. possess a 2 pi /2kF - periodic superstructure in chain direction which is incommensurate with the basic structure. The phase of the superstructure is identical in all chains. On the basis of the so-determined phonon dispersion the neu-

tron scattering law S(k, omega) is obtained. At the superstructure-point phase and amplitude mode contribute with equal weight. Going from the anomaly to the 'normal' region, however, this weight is shifted rapidly to one branch only. Convoluting S(k, omega) with an instrumental resolution-ellipsoid and using the data of the linear Peierls-semiconductor K sub 2 Pt(CN) sub 4 Br sub 0 . sub 3 .3.2H sub 2 0 (KCP), one can finally obtain an intensity contour-diagram of inelastically scattered neutrons which is in good qualitative agreement with the actually measured intensity profiles. (Atomindex citation 09:409315)

KFK-2638 PC **A07**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Angewandte Kernphysik.
Monte-Carlo Calculations for the Simulation of Channeling Experiments with V sub 3 Si Single-Crystals.
R. Kaufmann. May 78, 135p
In German.
U.S. Sales Only.

The results of channeling investigations on single-crystals of A15-type structure, like e.g. V sub 3 Si, are not directly comparable to analytical model calculations. Therefore, the channeling process was simulated in a Monte-Carlo program on the basis of the binary collision model. The calculated values for the minimum yield, CHIsub(min), and the critical angle, PSIsub(1/2), were in good agreement with the results of experiments with 2-MeV-exp 4 He exp + particles. The lattice damage in the range of 2,000 Angstroms at the surface after an irradiation with a fluence of 6 x 10 exp 16 - exp 4 He exp + /cm exp 2 at 300 keV could be explained by normally distributed static displacements of the V atoms with a mean value of 0.05 A. The transverse damage structure after an irradiation with a fluence of 1.5 x 10 exp 16 - exp 4 He exp + /cm exp 2 at 50 keV could be simulated by a step profile of 50% displacements of the V atoms with a maximum value of 0.5 Angstroem at the depth of the projected range. (Atomindex citation 09:399601)

KFK-tr-574 PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Internationales Buero/Uebersetzergruppe.
Anomalous Diamagnetism (High-Temperature Meissner Effect) in the Compound CuCl.
N. B. Brandt, S. V. Kuvshinnikov, A. P. Rusakov, and M. V. Semenov. Jun 78, 12p
In German.
U.S. Sales Only.

Polycrystaline CuCl samples under hydrostatic compression of approximately 5 kbar have been cooled rather rapidly (>20 degrees/min). Thereby, starting at approximately 170 K, repeated transitions from the weak diamagnetic state with chi approximately - (10 exp 5 /10 exp 6) to the diamagnetic state with a magnetic susceptibility here chi = -1 (Meissner effect) have been observed, in some cases with a simultaneous strong increase (some orders of magnitude) in electrical conductivity. At temperatures below approximately 100 K, CuCl is going to the stationary or quasi-stationary state with chi approximately -1 which is stable in this temperature range for at least some hours. (Atomindex citation 09:406124)

N80-22634/3 PC **A05**/MF **A01**
California Univ., Los Angeles.
Cryogenic-Coolant He4-Superconductor Dynamic and Static Interactions.
S. Caspi, C. Chuang, Y. I. Kim, R. J. Allen, and T. H. E. Frederking. Apr 80, 90p NASA-CR-3262, UCLA-ENG-7867
Grant NSG-3153

A composite superconducting material (NbTi-Cu) was evaluated with emphasis on post quench solid cooling interaction regimes. The quasi-steady runs confirm the existence of a thermodynamic limiting thickness for insulating coatings. Two distinctly different post quench regimes of coated composites are shown to relate to the limiting thickness. Only one regime,, from quench onset to the peak value, revealed favorable coolant states, in particular in He2. Transient recovery shows favorable recovery times from this post quench regime (not drastically different from bare conductors) for both single coated specimens and a coated conductor bundle.

N80-23112/9 PC **A03**/MF **A01**
California Inst. of Tech., Pasadena. W. K. Kellogg Radiation Lab.
A Thermalized Ion Explosion Model for High Energy Sputtering and Track Registration.
L. E. Seiberling, J. E. Griffith, and T. A. Tombrello. Apr 80, 28p NASA-CR-162926, BAP-21
Contracts NGR-05-002-333, EX-76-G-03-1305

A velocity spectrum of neutral sputtered particles as well as a low resolution mass spectrum of sputtered molecular ions was measured for 4.74 MeV F-19(+2) incident of UF4. The velocity spectrum is dramatically different from spectra taken with low energy (keV) bombarding ions, and is shown to be consistent with a hot plasma of atoms in thermal equilibrium inside the target. A thermalized ion explosion model is proposed for high energy sputtering which is expected to describe track formation in dielectric materials. The model is shown to be consistent with the observed total sputtering yield and the dependence of the yield on the primary ionization rate of the incident ion.

N80-23190/5 PC **A03**/MF **A01**
Instituut voor Kernphysisch Onderzoek, Amsterdam (Netherlands).
Calculations of the Longitudinal and Lateral Distributions of the Energy Deposition of 100-500 Mev Electrons in Some Materials.
R. Maas, and A. Hurkmans. Oct 79, 31p
INTERIKO-79/3

The electromagnetic energy distribution of electron induced cascade showers was studied. Primary electron energies were between 100 and 500 MeV. The longitudinal distribution of the showers was calculated analytically and Monte Carlo methods are used to obtain the lateral distribution.

PATENT-4 190 701 Not available NTIS
Department of the Navy Washington DC
V3Ga Composite Superconductor.
Patent,
David G. Howe, and Donald U. Gubser. Filed 6 Apr 79, patented 26 Feb 80, 6p AD-D007 182/9, PAT-APPL-6-027 691
Supersedes PAT-APPL-6-027 691, AD-D006 011.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A composite superconductor which comprises: (1) A matrix of a copper-base alloy containing from about 12 to about 20 at. % of gallium and from about 0.2 to about 6 at. % of aluminum; (2) a core in said matrix sheath, said core being of a vanadium-base alloy containing from about 1.0 to about 9.5 at. % of gallium and from about 0.1 to about 2.5 at. % of titanium; and (3) a continuous interfacial layer of V3Ga between said matrix sheath and said core. (Author)

PB80-178007 Not available NTIS
National Bureau of Standards, Washington, DC.
Ground State Excitations in HoCo2.
Final rept.,
J. J. Rhyne, N. C. Koon, and B. N. Das. 1979, 2p
Pub. in Journal of Mag. Magn. Mater. 14 p273-174 1979.

Spin excitations in a single crystal of the Laves phase compound HoCo2 have been studied using inelastic neutron scattering. At 4K three modes are observable: an in-phase spin precision acoustic mode and two out-of-phase optic modes involving the rare earth spins. A self-consistent Green's function RPA theory has been used to analyze the data and obtain exchange and crystal field parameters.

PB80-178015 Not available NTIS
National Bureau of Standards, Washington, DC.
Magnetic Properties of the Superconducting Alloy System (Ce(1-c)Ho(c))Ru2.
Final rept.,
J. W. Lynn, and C. J. Glinka. 1979, 2p
Pub. in Journal of Mag. Magn. Mater. 14 p179-180 1979.

Neutron scattering measurements have been carried out on the superconducting alloy system (Ce(1-c)Ho(c))Ru2 for c=0.10, 0.32 and 0.38 as a function of temperature and magnetic field. The observed crystal-field transitions for all concentrations are found to be very similar and can be understood on the basis of a cubic crystal field acting on the Ho(3+) (J=8), with W=+0.03 meV and x=-0.3. The Ho ground state is thus established to be the magnetic Gamma(5) triplet over the entire composition range of interest. Small-angle scattering data taken on an alloy with 38% Ho, in which a conventional ferromagnetic transition was anticipated, show that indeed ferromagnetic correlations develop at low temperatures. However, no characteristic peak in the intensity vs. temperature was observed; rather the intensity at small wave-vectors Q continues to increase slowly down to the lowest temperatures attained (1.05K), while little intensity change is observed below about T=2K at larger Q (0.05 yields 0.15/A).

PB80-178098 Not available NTIS
National Bureau of Standards, Washington, DC.
Ultraviolet Photoelectron Spectroscopy of Pd-Si Glasses.
Final rept.,
B. J. Waclawski, and D. S. Boudreaux. 1980, 3p
Pub. in Solid State Commun., v33 p589-591 1980.

In order to determine systematic changes in the density of states with alloy composition, photoelectron spectra at h nu = 21.2 eV were measured for several amorphous alloys based on the well-known Pd-Si glass system. Three binary alloys with 15, 20, and 25 at. % Si, two ternaries, Pd80 Si17 Cu3 and Pd 80 Si14 Cu6, and polycrystalline Pd were analyzed. Compared to Pd, both the density of states at the Fermi energy and the d-band width are reduced in the glasses. The d-bands display an overall shift of 0.4 eV over the range of alloy compositions studied. Partial agreement with recent density of state calculations was obtained.

PB80-178122 Not available NTIS
National Bureau of Standards, Washington, DC.
Bound Hole Pairs in Ni: Evidence from Photoemission.
Final rept.,
D. R. Penn. Nov 79, 3p
Pub. in Jnl. Appl. Phys., v50 n11 p7480-7482 Nov 79.

It is shown that the Ni d-band density of states contains a peak due to excitations of bound hole pairs. The density of states is observed directly in photoemission experiments which show a satellite peak below the bottom of the d bands.

PB80-178841 Not available NTIS
National Bureau of Standards, Washington, DC.
Magnetic Correlations and Crystal-Field Levels in the Superconductor (Ce(0.73)Ho(0.27))Ru2.
Final rept.,
J. W. Lynn, D. E. Moncton, L. Passell, and W. Thomlinson. Jan 80, 3p
Sponsored in part by Department of Energy, Washington, DC., and National Science Foundation, Washington, DC.
Pub. in Phys. Rev. B 21, n1 p70-78, 1 Jan 80.

Neutron scattering studies have been carried out to investigate the atomic magnetic properties of the magnetic superconductor Ce(0.73)Ho(0.27)Ru2. At low temperatures the appearance of elastic or quasielastic magnetic scattering at small momentum transfers is observed, indicating the development of ferromagnetic correlations. The temperature and wave-vector dependence of this scattering can be described to a good approximation by an Ornstein-Zernike correlation function over the entire range of wave vectors (0.035-0.20/A) and temperatures (0.05-4.2K) explored.

VTT-ENT-Pub-13 PC **A05**/MF **A01**
Valtion Teknillinen Tutkimuskeskus, Espoo (Finland).
Theory of Anomalous Hall Effect in Europium Chalcogenides.
Thesis (D.Techn.),
J. Sinkkonen. Apr 76, 78p
U.S. Sales Only.

Considering the exchange interaction between the conduction electrons in a broad 5d-type band and the magnetic electrons in the localized 4f-shells, it

is shown that in addition to the ordinary d-f exchange diagonal in band index, there is also a non-diagonal interaction representing a one particle transfer between the conduction and magnetic electrons. Including the spin-orbit coupling, an effective Hamiltonian for the conduction electrons is obtained, which contains additional asymmetric scattering terms. The ordinary d-f exchange is treated as the dominating scattering interaction. The anomatous Hall effect results by skew scattering and side jump mechanisms. The density matrix method is used to derive the transport properties. The effect of the correlation of spins at different lattice sites is discussed. The model indicates that the anomatous Hall effect can be seen in heavily doped samples. (Atomindex citation 09:405703)

20M. Thermodynamics

ITEP-169(1978) MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Solutions to the Ginzburg-Landau Equations for Planer Textures in Superfluid exp 3 He.
V. L. Golo, M. I. Monastyrsky, and S. P. NoVikov. 1978, 21p
U.S. Sales Only. Microfiche copies only.

The Ginzburg-Landau equations for planer textures of superfluid exp 3 He are proved to be equivalent to a hamiltonian for a completely integrable system. General solutions to these equations are obtained by means of hyperelliptic integrals. It is shown that the same method can be applied to two-dimensional textures in the A-phase of superfluid exp 3 He with cylindrical symmetry. (Atomindex citation 10:467984)

N80-22632/7 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Heating Rate Measurements over 30 Deg and 40 Deg (Half Angle) Blunt Cones in Air and Helium in the Langley Expansion Tube Facility.
N. M. Reddy. Mar 80, 58p NASA-TM-80207

Convective heat transfer measurements, made on the conical portion of spherically blunted cones (30 deg and 40 deg half angle) in an expansion tube are discussed. The test gases used were helium and air; flow velocities were about 6.8 km/sec for helium and about 5.1 km/sec for air. The measured heating rates are compared with calculated results using a viscous shock layer computer code. For air, various techniques to determine flow velocity yielded identical results, but for helium, the flow velocity varied by as much as eight percent depending on which technique was used. The measured heating rates are in satisfactory agreement with calculation for helium, assuming the lower flow velocity, the measurements are significantly greater than theory and the discrepancy increased with increasing distance along the cone.

20N. Wave Propagation

AD-A083 919/1 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Electromagnetic Scattering Patterns from Sinusoidal Surfaces: Vertical Polarization.
Memorandum rept.,
R. H. Lang, and A. K. Jordan. 17 Mar 80, 18p
Rept no. NRL-MR-4188

In this paper we present an analysis and calculation of scattering patterns resulting from a vertically polarized beam of electromagnetic plane waves incident on a sinusoidal surface. This model is frequently used to study scattering from periodically rough surfaces. The horizontally-polarized case is treated in a previous paper by the authors. The vector properties of this electromagnetic scattering problem are considered in this communication by extending the previous analysis to the vertically-polarized case and comparing the scattering patterns for the two polarizations. (Author)

N80-22574/1 PC **A03**/MF **A01**
Centre de Recherches en Physique de l'Environnement Terrestre et Planetaire, Orleans (France).
Coherent Generation of the Terrestrial Kilometric Radiation by Nonlinear Beatings Between Electrostatic Waves.
A. Roux, and R. Pellat. Mar 78, 34p NASA-CR-162869, CRPE-NT-56
Contract NGL-16-001-043

The propagation of electrostatic plasma waves in an inhomogeneous and magnetized plasma was studied. These waves, which are driven unstable by auroral beams of electrons, are shown to suffer a further geometrical amplification while they propagate towards resonances. Simultaneously, their group velocities tend to be aligned with the geomagnetic field. It is shown that the electrostatic energy tends to accumulate at, or near omega sub LH and omega sub UH, the local lower and upper hybrid frequencies. Due to this process, large amplitude electrostatic waves with very narrow spectra are observed near these frequencies at any place along the auroral field lines where intense beam driven instability takes place. These intense quasi-monochromatic electrostatic waves are shown to give rise to an intense electromagnetic radiation. Depending upon the ratio omega sub pe/omega sub ce between the electron plasma frequency and the electron gyro-frequency the electromagnetic wave can be radiated in the ordinary mode (at omega sub UH), or in the extraordinary (at 2 omega sub UH). As the ratio omega sub pe/omega sub ce tends to be rather small, it is shown that the most intense radiation should be boserved at 2 omega sub UH in the extraordinary mode.

21. PROPULSION AND FUELS

21A. Air-Breathing Engines

N80-22403/3 PC **A03**/MF **A01**
European Space Agency, Paris (France).
Combustion of Boron in Airbreathing Rockets: Effects of the Secondary Combustion Chamber.
A. Boussios. Jul 79, 44p ESA-TT-535, DFVLR-FB-78-03
Transl. Into English of "Verbrennung von Bor in Luftatmenden Raketenantrieben - Sekundaerbrennkammerprozesse", Rept. Dfvlr-FB-78-03 Dfvlr, Brunswick (Germany, F.R.), Jan. 1978. Original Report in German Previously Announced as X79-72110.

A performance comparison was calculated for a solid propellant containing 50% by weight of boron, and a powder injection where the propellant contained between 50% and 90% by weight of boron. The efficiency of combustion in the secondary chamber of an airbreathing rocket having powder injection was investigated using pressure changes from 2.5 to 11 bar, while keeping the boron percentage constant. A variation keeps the pressure constant and varies the boron percentage in the propellant between 50.5% and 87% by weight of boron.

21B. Combustion and Ignition

AD-A083 722/9 PC **A03**/MF **A01**
Purdue Univ Lafayette IN Project Squid Headquarters
Shock Tube Studies of the N2O/CH4/CO/Ar and N2O/C2H6/CO/Ar Systems.
Technical rept.,
Anthony M. Dean, and Ron L. Johnson. Apr 79, 42p Rept no. SQUID-UMO-5-PU
Contract N00014-75-C-1143
Prepared in cooperation with Missouri Univ., Columbia, MO. Dept. of Chemistry.

Reflected shock waves were used to heat N2O/C2H6/CO/Ar and N2O/CH4/CO/Ar mixtures to temperatures of 1875-2855 K at total concentrations of 5 x 10 to the 18th power CC. Oxygen atom production was monitored via the flame band emission at 450 nm, and CO2 production was observed at 4.27 micrometers. These data were then compared to the results of numerical integration of the rate equations, using rate constant and mechanistic information obtained in earlier studies of H2 and CH2O under similar conditions. For the C2H6 mixture, it was possible to achieve good agreement between these calculations and the observed data using only one addition reaction O + CH3 yileds CH2O + OH. The calculations were insensitive to the precise value used, but the results are consistent with recent high temperature literature values. For the CH4 mixture, the best agreement was achieved using a recent high temperature value for O + CH4 yields CH3 + OH. The data indicated that this reaction has a markedly non-Arrhenius rate constant; use of a value based upon low temperature data gives results inconsistent with those observed. The CH4 system was insensitive to any other methane reaction rate constant. There was some experimental evidence to suggest an unsuspected complexity in methyl radical decay channels at the lowest temperatures observed. The mechanism/rate constant combination used here was then applied to the analysis of literature data for CH3 oxidation by O2. This analysis was designed to obtain a value for the rate constant of CH3 + O2 yields CH2O + OH.

AD-A083 723/7 PC **A03**/MF **A01**
Purdue Univ Lafayette IN Project Squid Headquarters
Second-Order Closure Modeling of Variable Density Turbulent Flows.
Technical rept.,
Ashok K. Varma, Peter J. Mansfield, and Guido Sandri. Mar 79, 44p Rept no. SQUID-ARAP-2-PU
Contract N00014-75-C-1143
Prepared in cooperation with Aeronautical Research Associates of Princeton, Inc., Princeton, NJ.

Mixing and Chemical reactions under turbulent flow conditions are a basic feature of the energy release processes in many combustion and propulsion systems. The development of predictive calculation procedures for these systems requires the understanding and modeling of coupling between turbulence and various physical and chemical processes. Second-order closure modeling of turbulent flows provides a rational framework for studying these interactions. Models for the scalar probability density function (pdf) have to be developed to achieve closure of turbulent transport equations for mixing and reacting flows. A delta function 'typical eddy' pdf model for two species flows has been developed and incorporated into a complete second-order closure computer program. The program has been used to study uniform and variable density flowfields and the model predictions have been compared to experimental measurements. The modeling of turbulence dynamics for variable density flows requires further improvement. However, the importance of modeling the higher-order scalar correlations has been demonstrated. A number of statistical constraints on three species flowfields have also been derived. These will be useful in the development of the 'typical eddy' pdf modelfor reacting flows. (Author)

AD-A083 737/7 PC **A04**/MF **A01**
Ohio State Univ Columbus Dept of Aeronautical and Astronautical Engineering
Ignition, Combustion, Detonation, and Quenching of Reactive Mixtures.
Interim rept. 1 Apr 78-31 Mar 79,
Rudolph Edse. Nov 79, 51p AFOSR-TR-80-0302
Grant AFOSR-78-3604

The effects of initial gas temperature, pressure, density, and energy transfer to the gas in the detonation wave have been studied to develop an equation which can be used to predict the length of transition from deflagration to detonation (induction distance) in confined and unconfined combustible gas mixtures. Flame speeds of various hydrogen-oxygen-inert gas mixtures have been measured to determine the relationship between flame speed (deflagration) and induction distance. A nozzle burner having a sine curve contour was used for these experiments to obtain well-defined laminar flame cones permitting reliable and reproducible evaluations. The quenching distances of methane-air, methane-oxygen, acetylene-air and hydrogen-air flames were not affected by potassium chloride, sodium-bicarbonate, or potassium phosphate coatings on the quenching surfaces. It was also found that the quenching distances of these flames are independent of the linear speed of the unburned gas as long as the flows are laminar. Variations of the burner width also did not affect the quenching distances. However, rather

significant increase of the quenching distances were observed when the narrow sides between the quenching distances were observed when the narrow sides between the quenching surfaces were closed. New iteration formulas have been developed to simplify to simplify and reduce the computational work for calculating detonation parameters and the performance of thermal engines (ramjet, rocket, gas turbine, and internal combustion engine). (Author)

AD-A083 738/5 PC **A03**/MF **A01**
Cornell Univ Ithaca NY Dept of Theoretical and Applied Mechanics
Mathematical Theory of Laminar Combustion. V. Unsteady Burning of a Linear Condensate.
Interim technical rept.,
J. D. Buckmaster, and G. S. S. Ludford. Mar 80, 29p TR-107, ARO-15882.12-M
Contract DAAG29-79-C-0121
See also report dated Oct 78, AD-A064 038.

This report is Chapter V of the twelve in a forthcoming research monograph on the mathematical theory of laminar combustion. The unsteady burning of a linear condensate is discussed due, for example, to an impinging acoustic wave. Stability of steady states is also considered. (Author)

AD-A083 822/7 PC **A03**/MF **A01**
Wisconsin Univ-Madison Mathematics Research Center
Evolution of Deflagration in a Cold Combustible Subjected to a Uniform Energy Flux.
Technical summary rept.,
A. K. Kapila. Feb 80, 35p Rept no. MRC-TSR-2040
Contract DAAG29-75-C-0024

The title problem is treated in the limit of large activation energy. It is shown that the evolutionary process takes place in a series of distinct stages, and the spatial and temporal structure of each stage is described. It is found that subsequent to thermal runaway, the behavior of the system resembles that of self-induced combustion, except that the thermal explosion is now confined to a thin surface layer. Burning of an initially cold combustible material is studied. It is assumed that combustion is initiated by heating the surface of the material. This will result in a chemical reaction first occurring at the surface, and then spreading through the material in the form of a flame or deflagration wave. Asymptotic methods are used to study the transient process leading to the establishment of the flame. Attention is confined to solid combustibles, but it is envisaged that the techniques developed here will aid in the eventual understanding of the evolution of gaseous combustion.

AD-A083 889/6 PC **A03**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Analytical Models for the Compressive Heating Ignition of High Explosives.
Final rept.,
John Starkenberg. Mar 80, 43p ARBRL-TR-02225, AD-E430 415

Two one-dimensional models to predict the temperature history of an explosive surface subject to compressive heating from the rapid collapse of an adjacent air layer are reported herein. Computations made using the more sophisticated finite compression-rate model show qualitative agreement with the experimental behavior while results obtained from the simpler adiabatic compression model are sometimes misleading. The most important observation is that planar one-dimensional gap closure cannot explain ignition as observed in experiments. Several multidimensional effects have been introduced into the models. The results show that enhanced energy transport caused by convection and turbulence must be present in conjunction with rapid local pressurization and/or convergent air-flow, unless the enhancement is confined to a boundary layer adjacent to the explosive. In addition, the dieseling mechanism of sensitization has been considered indicating that explosive particle sizes small enough to exhibit increased temperature may be present.

AD-A083 904/3 PC **A05**/MF **A01**
Aerospace Corp El Segundo CA
Multicolor Inversion Diagnostic for Tactical Motor Plumes.
Interim rept.,
Stephen J. Young. May 80, 93p TR-0080(5623)-1, AFRPL-TR-80-30
Contract F04701-79-C-0080

A theoretical and analytical analysis is presented on the application of multispectral emission/absorption inversion to the retrieval of temperature and concentration profiles of tactical rocket motor plumes. Consideration is given to both monochromatic and band model spectral scales. A main conclusion drawn from the analysis is that application in the infrared on either the monochromatic or wide band spectral scale cannot yield adequate inversions for small plumes with mild temperature gradients such as those encountered for tactical rocket motor. Even under the most ideal circumstances, temperature and concentration errors up to 30% are encountered. The failing of the method is due to the lack of spatial resolution inherent in the inversion weighting functions. (Author)

AD-A083 912/6 PC **A04**/MF **A01**
Naval Research Lab Washington DC
Computational Approaches to the Study of Reactive Flow Mixing.
Memorandum rept.,
J. P. Boris, and E. S. Oran. 13 Feb 80, 51p Rept no. NRL-MR-4137

The presence of turbulence alters mixing and reaction times in chemically reactive flows. These effects in turn modify the heat and mass transfer rates and hence the local and global dynamics of combustion systems. The goal of this paper is to first describe the fundamental physical processes we must model to understand reactive flow turbulence and then to show how detailed ab initio modelling of these phenomena may be used to help construct phenomenological turbulence model for reactive flows. Three different aspects of reactive flow mixing are identified as focal points for the detailed modelling and several important criteria are established which an accurate and consistent sub grid reactive flow mixing phenomenology should satisfy. One possible representation for such a generalized phenomenology is presented. (Author)

AD-A084 017/3 PC **A04**/MF **A01**
Southwest Research Inst San Antonio TX Mobile Energy Div
Fuel Property Effects on Combustor Performance.
Final rept.,
C. A. Moses, and D. W. Naegeli. Mar 80, 54p Rept no. SWRI-MED114
Contract N00140-77-C-1345
See also Phase 1, AFLRL-101 dated Jan 78, AD-A054 229.

Two combustor rigs have been used to study the sensitivities of combustor operation to the physical and chemical properties of fuels. Eighteen fuels including synfuels were used to accentuate the properties of concern: composition, viscosity, and boiling-point distribution. Flame radiation and smoke were best correlated by hydrogen content rather than hydrocarbon structure; the soot formation was due to gas-phase reactions. Lean-blowout conditions were about the same for all fuels except that gasoline could be burned leaner at idle conditions. Ignition limits were more sensitive to volatility than viscosity. Gaseous emissions and combustion efficiency were not significantly affected by fuel properties although some sensitivity to boiling point distribution was evident. In all performance areas, the syncrude fuels correlated in the same ways as the petroleum-derived fuels except for the NOx emissions from the nitrogen containing shale oil fuel. (Author)

N80-22430/6 PC **A11**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Ultralean Combustion in General Aviation Piston Engines.
J. E. Chirivella. 1 Dec 79, 246p NASA-CR-163001, JPL-PUB-79-75
Contract NAS7-100

The role of ultralean combustion in achieving fuel economy in general aviation piston engines was investigated. The aircraft internal combustion engine was reviewed with regard to general aviation requirements, engine thermodynamics and systems. Factors affecting fuel economy such as those connected with an ideal leanout to near the gasoline lean flammability limit (ultralean operation) were analyzed. A Lycoming T10-541E engine was tested in that program (both in the test cell and in flight). Test results indicate that hydrogen addition is not necessary to operate the engine ultralean. A 17 percent improvement in fuel economy was demonstrated in flight with the Beechcraft Duke B60 by simply leaning the engine at constant cruiser power and adjusting the ignition for best timing. No detonation was encountered, and a 25,000 ft ceiling was available. Engine roughness was shown to be the limiting factor in the leanout.

N80-22449/6 PC **A04**/MF **A01**
European Space Agency, Paris (France).
Stabilization of Flame in a Ramjet Combustor by Means of a Pilot Gas Generator.
E. Riester. Dec 78, 61p ESA-TT-511-REV, DLR-FB-77-54
Transl. into English of "Flammenstabilisierung in Staustrahl-Brennkammern durch Einen Pilot-Gasgenerator", Rept. Dlr-FB-77-54 Dfvlr, Brunswick, Nov. 1977. Original Report in German Previously Announced as X79-72011.

The use of a pilot gas generator to shift the flameout limit in a ramjet combustion chamber toward a higher excess of air was investigated. Flame stabilization in ramjet combustion chambers is difficult, because of the high combustion-chamber inlet velocity and the low temperatures. Often, the flameout limit for lean mixtures is only slightly removed from the stoichiometric mixing ratio. The velocity curves were determined in a typical ramjet combustion chamber system. The lean-mixture flameout limits were measured, first without and then with a pilot gas generator, and compared. A small stoichiometrically-operating propane-oxygen burner is used as the pilot gas generator.

N80-22509/7 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
Laboratory Measurements in a Turbulent, Swirling Flow.
Final Report.
D. P. Hoult. Nov 79, 52p NASA-CR-159723
Grant NSG-3076

Measurements of soot inside a flame-tube burner using a special water-flushed probe are discussed. The soot is measured at a series of points at each burner, and upon occasion gaseous constitutents NO, CO, hydrocarbons, etc., were also measured. Four geometries of flame-tube burners were studied, as well as a variety of different fuels. The role of upstream geometry on the downstream pollutant formation was studied. It was found that the amount of soot formed in particularly sensitive to how aerodynamically clean the configuration of the burner is upstream of the injector swirl vanes. The effect of pressure on soot formation was also studied. It was found that beyond a certain Reynolds number, the peak amount of soot formed in the burner is constant.

21D. Fuels

BNL-51077 PC **A05**/MF **A01**
Brookhaven National Lab., Upton, NY.
US Oil and Gas System Representation in the EEMIS Data Structure.
J. D'Acierno, A. Hermelee, M. Beller, N. Bhagat, and J. Rabinowitz. Nov 79, 93p
Contract EY-76-C-02-0016

The object of this report is to demonstrate the physical aspects of the United States oil and natural gas industries which are incorporated in the design of the data structure of the Energy Emergency Management Information System (EEMIS) for the US Department of Energy (DOE). The overall data-structure guidelines were to provide information needed to address energy emergencies and to carry out US Department of Energy missions. Therefore, the data structure is designed to convey current and historical information relating to stocks and flows of energy commodities in the US. 8 figures, 3 tables. (ERA citation 05:015923)

DOE/ET/14815-4 PC **A02**/MF **A01**
Bituminous Coal Research, Inc., Monroeville, PA.

Combined Shift and Methanation in a Fluidized-Bed Reactor. Quarterly Progress Report, 1 October-31 December 1979. BCR Report L-1061.
R. C. Streeter. Jan 80, 14p
Contract AC01-79ET14815

Construction of a new bench-scale methanation reactor is in progress. This system will provide the capability of adding steam to the feed gas. A bench-scale activity test, employing four samples of a Ni/Mo catalyst, was conducted using the existing life test system. Results showed that a spent catalyst sample containing 18 percent carbon was still as active as the fresh, as-received catalyst, thus confirming an earlier observation based on the results of PEDU Test No. 37. The activity of one sample that was previously heated at 450 C to remove the carbon seemed abnormally low. However, the results were inconclusive, and this sample will be tested further. No PEDU tests were scheduled. Some planned modifications to the PEDU reactor system are being delayed due to late delivery of a water injection pump and malfunctioning of new ball valves intended for installation on the catalyst sampling system. Arrangements have been made with Dr. Calvin Bartholomew of Brigham Young University to undertake continued studies on carbon deposition and catalyst regeneration. A research proposal submitted by Dr. Bartholomew has been reviewed and approved, and the BYU work is expected to commence early in January 1980. (ERA citation 05:014643)

DOE/IA-0009-4 PC **A14**/MF **A01**
Department of Energy, Washington, DC.
Joint Peru/United States Report on Peru/United States Cooperative Energy Assessment. Volume 4 of 4 Volumes Annexes 8-11.
Aug 79, 311p

A comprehensive assessment of the biofuel potential of Peru is presented. Topics discussed cover current biofuel utilization practices; evaluation of Peruvian biomass productivity; identification of Peruvian agricultural and forestry resources; assessment of resource development and management concerns; identification of market considerations; description of biofuel technological options; and regional identification of biofuel technology applications. The discussion of current biofuel utilization centers on a qualitative description of the main conversion approaches now being practiced in Peru. Biomass productivity is evaluated in the context of the terrain, soil, and climatic conditions found in Peru. A quantitative description of the energy potential that could be realized from agricultural and forestry resources of Peru follows. A regional picture is given for the production of agricultural residues and forest resources that could potentially supply energy. The assessment of resource development and management concerns focuses on harvesting, reforestation, training, and the environmental consequences of utilization of forest resources. Market factors assessed include: importation, internal market development, external market development, energy policy and pricing, and transportation. Ten biofuel technology options for Peru were identified: small- to medium-scale gasification, a wood waste inventory, stationary and mobile charcoal production systems, wood distillation, forest resource development and management, electrical cogeneration, anaerobic digestion technology, development of ethanol production capabilities, and agricultural strategies for fuel production.Based upon these biofuel options, nine applications were identified for the Costa Region, eight for the Sierra Region, and ten for the Selva Region. (ERA citation 05:015182)

FE-2030-TR17 PC **A06**/MF **A01**
Pennsylvania State Univ., University Park. Coal Research Section.
Kinetics of Lignite Pyrolysis in Fixed Bed and Entrained Flow Reactors. Technical Report No. 17.
A. W. Scaroni, and P. L. Walker, Jr. Aug 79, 112p
Contract EX-76-C-01-2030

A laminar flow isothermal furnace has been constructed and used to study lignite pyrolysis in nitrogen at temperatures between 700 exp 0 and 1000 exp 0 C. Particles of a Texas lignite (Darco Seam) between 41 and 201 microns in mean diameter, are found to flow down the furnace tube with velocities approximated by the summation of the gas plug-flow velocity and particle free-fall velocities. Some particle shrinkage and density changes occur during pyrolysis. Pyrolysis rate is particle size independent and increases with increase in temperature over the range of operating conditions. Ultimate yield of volatiles in the isothermal furnace, which is calculated from the linear relationship between weight loss and change in proximate volatile matter, is 66% of the original dry-ash-free coal and is particle size independent and relatively temperature independent. Ultimate yields of volatiles from fixed beds of pulverized coal are smaller than for dispersed particles of the same size. Proximate volatile matter for the lignite is, for example, 51% of the original dry-ash-free coal. Heating rates drop from about 10,000 exp 0 C/s in the isothermal furnace to about 20 exp 0 C/s in the proximate volatile matter test. Pyrolysis rates decrease and display particle size dependency in fixed beds. This implication of physical rate control is attributed to heat transfer limitations. It is proposed that pyrolysis rate and therefore residence time of volatiles in the fixed bed are important parameters affecting the preponderance of secondary char forming reactions.Also important is the total particle external surface area in the bed. Secondary char formation is considered responsible for yields of volatiles lower than the true volatile content of the lignite as measured in the isothermal furnace. (ERA citation 05:014699)

FE-2031-14 PC **A12**/MF **A01**
University of Southern California, Los Angeles.
Chemistry and Structure of Coal Derived Asphaltenes and Preasphaltenes. Interim Report.
T. F. Yen. 1979, 256p
Contract EX-76-C-01-2031

It is the objective of this project to isolate the asphaltene and preasphaltene fractions from coal liquids from a number of liquefaction processes. These processes consist of in general: catalytic hydrogenation, staged pyrolysis and solvent refining. The asphaltene fractions may be further separated by both gradient elution through column chromatography, and molecular size distribution through gel permeation chromatography. These coal-derived asphaltene and preashpaltene fractions will then be investigated by various chemical and physical methods for characterization of their structures. After the parameters are obtained, these parameters will be correlated with the refining and conversion variables which control a given type of liquefaction process. The effects of asphaltene in catalysis, ash or metal removal, desulfurization and denitrification will also be correlated. It is anticipated that understanding the role of asphaltenes in liquefaction processes will enable engineers to both improve existing processes, and to make recommendations for operational changes in planned liquefaction units. The objective of Phase 1 was to complete the isolation and separation of coal liquid fractions and to initiate their characterization. The objective of Phase 2 is to continue the characterization of coal asphaltenes and other coal liquid fractions by use of physical and instrumental methods. The structural parameters obtained will be used to postulate hypothetical average structures for coal liquid fractions.The objective of Phase 3 is to concentrate on the characterization of the preasphaltene (benzene insoluble fraction) of coal liquid fraction by the available physical and chemical methods to obtain a number of structural parameters. (ERA citation 05:014688)

FE-2307-30 PC **A03**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Research and Development of Rapid Hydrogenation for Coal Conversion to Synthetic Motor Fuels (Riser Cracking of Coal). Third Quarter Report, October 1 to December 31, 1977.
D. A. Duncan, J. L. Beeson, and R. D. Oberle.
Mar 78, 33p
Contract EX-76-C-01-2307

The preliminary series of runs in the bench-scale unit has been completed, and the most important variables affecting total conversion of feed carbon to gaseous and liquid products have been found to be the hydrogen-to-coal feed ratio and the severity of thermal treatment as measured by a kinetic severity function. The distribution of chemical species within the gaseous and liquid products was found to be affected by temperature profile, or the manner in which the thermal treatment is applied to the reactants. The design of a process development unit (PDU) has been completed; the proposed riser reactor will be contained in a cold-wall pressure shell to minimize stresses in the walls of the riser tube. The reactants will be heated by direct combustion within the riser tube, thereby eliminating the need for heat transfer surfaces. The proposed PDU can be operated in either a liquefaction or a gasification mode. (ERA citation 05:014691)

FE-2689-5 PC **A02**/MF **A01**
Germantown Labs., Inc., Philadelphia, PA.
Investigation of Fuels Containing Coal-Oil-Water Emulsions. Fifth Quarterly Report, 1 October 1978-1 December 1978.
N. H. Cherry, and C. S. Stokes. Jan 79, 16p
Contract EF-77-C-01-2689

The assessment of five emulsifiers for the production of stable coal-oil-water emulsions and the determination of the practibility of their use in a boiler system is being investigated. Four emulsifiers are on hand, the fifth is yet to be chosen. Ancillary equipment has been set up and experiments completed on two units. Mounting fixtures have been designed and fabricated for the third and fourth units. The third unit has been evaluated using 45% coal, 50% number 6 Gulf oil and 5% water. The stability of the emulsions is being evaluated on the K-scan unit. (ERA citation 05:014753)

LBL-10219 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Rapid Ethanol Production Via Fermentation.
B. Maiorella, H. W. Blanch, and C. R. Wilke. Nov 79, 29p CONF-791108-19
Contract W-7405-ENG-48
72. AICHE meeting, San Francisco, CA, USA, 25 Nov 1979.

The flash-ferm process for industrial rapid ethanol fermentation with ethanol removal and concentration in an auxiliary flash vessel has been developed. The super high productivities (80 g ethanol/L.hr.) of the vacu-ferm processes are maintained while many disadvantages are eliminated. Flash-ferm combines synergistically with a vacuum distillation, providing a high ethanol concentration feed to the less strongly pinch limited separator. A 42% energy savings and a 54% reduction in manufacturing cost (exclusive of feed) is achieved as compared to conventional bath processes. (ERA citation 05:017476)

N80-22431/4 PC **A11**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Detonation-Flame Arrester Devices for Gasoline Cargo Vapor Recovery Systems.
Final Report.
R. A. Bjorklund, and P. R. Ryason. Mar 80, 245p
NASA-CR-163009, JPL-PUB-80-18
Contract Z70099-7-74328-H
Sponsored by NASA.

Empirical data on the deflagration-to-detonation run-up distance for flowing mixtures of gasoline and air in 15.2-cm- (6.0-in.-) diameter piping simulating a vapor recovery system are presented. The quenching capability of eight selected flame control devices subjected to repeated stable detonations was evaluated. The successful detonation-flame arresters were: (1) spiral-wound, crimped aluminum ribbon, (2) foamed nickel-chrome metal, (3) vertically packed bed of aluminum Ballast rings, and (4) water-trap or hydraulic back-pressure valve. Installation configurations for two of the more applicable arresters, the spiral-wound, crimped stainless-steel ribbon and the vertically packed bed of aluminum Ballast rings, were further optimized by a series of parametric tests. The final configuration of these two arresters was demonstrated with repeated detonation tests at conditions that simulated vapor recovery system operation. On these tests, the combustible mixture of gasoline and air continued to flow through the piping for periods up to 120 seconds after the initial detonation had been arrested. There was no indication of continuous burning or reignition occurring on either side of the test arresters.

N80-22432/2 PC **A04**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.

Analysis of NASA Jp-4 Fire Tests Data and Development of a Simple Fire Model.
P. Raj. Apr 80, 58p NASA-CR-159209, REPT-81857-6
Contract NAS1-15380

The temperature, velocity and species concentration data obtained during the NASA fire tests (3m, 7.5m and 15m diameter JP-4 fires) were analyzed. Utilizing the data analysis, a sample theoretical model was formulated to predict the temperature and velocity profiles in JP-4 fires. The theoretical model, which does not take into account the detailed chemistry of combustion, is capable of predicting the extent of necking of the fire near its base.

N80-22525/3 PC **A05**/MF **A01**
Technische Hochschule, Aachen (Germany, F.R.). Inst. fuer Eisenhuettenkunde.
Pressure-Change Underground Gasification: Theoretical and Experimental Investigations of Gasification.
Final Report.
C. P. Beckervordersandforth, J. Belzer, M. Kuehn, M. Mohtadi, and W. Sitte. Jun 79, 93p BMFT-FB-T-79-05
Text in German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

The extraction of SNG, reduction gas, and other gaseous fuels by means of in situ coal gasification with hydrogen, air, and oxygen mixtures was studied both theoretically and experimentally. Special emphasis was placed on the pressure-change process. Simulation experiments were carried out above ground at pressures up to 60 bar and temperatures up to 1000 C. A feasibility study was performed taking into account technical and economic factors.

N80-22776/2 PC **A08**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Literature Survey of Properties of Synfuels Derived from Coal.
Interim Report.
T. W. Reynolds, R. W. Niedzwiecki, and J. S. Clark. Feb 80, 162p NASA-TM-79243, DOE/NASA/2593-79/8
Contract EF-77-A-01-2593

A literature survey of the properties of synfuels for ground-based gas turbine applications is presented. Four major concepts for converting coal into liquid fuels are described: solvent extraction, catalytic liquefaction, pyrolysis, and indirect liquefaction. Data on full range syncrudes, various distillate cuts, and upgraded products are presented for fuels derived from various processes, including H-coal, synthoil, solvent-refined coal, donor solvent, zinc chloride hydrocracking, co-steam, and flash pyrolysis. Some typical ranges of data for coal-derived low Btu gases are also presented.

PB80-176878 PC **A05**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC. Natural Resource Economics Div.
Wood and Energy in New England: A Review and Bibliography.
Bibliographies and literature of agriculture,
Lynn Palmer, Robert McKusick, and Mark Bailey. Apr 80, 77p B/LA-7

Because of New England's dependence on petroleum products for energy (89 percent of total energy consumed in 1976 included natural gas), its energy costs are nearly 30 percent higher than the national average. Forest land, covering almost 80 percent of New England, contains a huge volume of fuelwood that could potentially provide the equivalent of 55 million barrels of oil a year. This report reviews a number of fuelwood feasibility studies, fuelwood's role in the national and regional energy picture, wood availability and demand, energy alternatives, and environmental impact.

PB80-180672 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Test and Evaluation Branch.
Evaluation of XRG Number 1 a Fuel Additive.
Technical rept.,
Edward Anthony Barth. Feb 80, 16p EPA-AA-TEB-80-12

The Environmental Protection Agency receives information about many systems which appear to offer potential for emission reduction or fuel economy improvement. EPA invites developers of such systems to provide technical and test data on the system. In those cases for which review by EPA technical staff suggest that the data available shows promise, attempts are made to schedule tests at the EPA Motor Vehicle Emission Laboratory. The results of all such test projects are set forth in a series of Test and Evaluation Reports, of which this report is one. In February, 1978 the EPA tested NRG No. 1, a fuel additive developed and marketed by NRG International, Inc. of Clayville, New York. Contrary to NRG's claims, the test results showed 'neither a general increase in fuel economy nor a decrease in emissions associated with the addition of NRG No. 1 to the fuel.' In response to a request from the Federal Trade Commission for more in-depth information on NRG No. 1 (now referred to as 'XRG No. 1'), this new series of tests was performed.

PB80-810948 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Automobile Air Pollution: Automotive Fuels. 1970-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1970-May 80,
Diane M. Cavagnaro. Jun 80, 156p
Supersedes NTIS/PS-79/0226 and NTIS/PS-78/0235.

The use of fuels and fuel additives to reduce pollution from automobiles is covered in this bibliography. The use of methyl alcohol, natural gas, methane, and hydrogen is reported. Improvements to gasoline and its properties which affect air pollution are discussed, along with studies on lead additives. (This updated bibliography contains 147 abstracts, 10 of which are new entries to the previous edition.)

PB80-811086 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Hydrogen Storage: Storage as a Gas or Liquid. 1974-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1974-May 80,
Diane M. Cavagnaro. Jun 80, 151p
Updates NTIS/PS-75/379. Supersedes NTIS/PS-79/0581 and NTIS/PS-78/0546.

The bibliography relates to storing hydrogen as a liquid or a gas. Topics include fuel storage, energy storage, and the construction of tanks used to store the material. Any type of storage that is related to batteries, fuel cells, or solar cells are excluded, unless the abstract states that its purpose is to store hydrogen. (This updated bibliography contains 144 abstracts, 18 of which are new entries to the previous edition.)

PB80-811094 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Hydrogen Storage: Hydrogen as a Hydride. 1974-May, 1980 (Citations from the NTIS Data Base).
Rept. for 1974-May 80,
Diane M. Cavagnaro. Jun 80, 142p
Updates NTIS/PS-75/379. Supersedes NTIS/PS-79/0582 and NTIS/PS-78/0547.

The bibliography covers hydrogen storage as a hydride. Topics include the chemical and physical properties of the hydride, and how useful it may be for hydrogen storage. Also considered is the conversion of hydrogen to a hydride and the conversion back to hydrogen. (This updated bibliography contains 135 abstracts, 14 of which are new entries to the previous edition.)

SERI/TR-332-360(V.1) PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Biotechnology for Producing Fuels and Chemicals from Biomass: Recommendations for R and D. Volume I. Synopsis and Executive Summary.
R. Villet. Dec 79, 29p
Contract EG-77-C-01-4042

Areas of research and development judged to be crucial for establishing a biotechnology of biomass processing are identified. Two general avenues are recommended for R and D: (1) in the near term, revival of the older fermentation technology and improvement of processing efficiencies; and (2) in the longer term, the development of novel biotechnological processes, such as for the conversion of lignocellulosic biomass to fuels and chemicals. Recommended R and D ranges from work in moleular genetics to biochemical engineering aspects of plant design. It is recommended that the R and D strategy be designed as an integration of three disciplines: biochemical engineering, microbial genetics, and biochemistry. Applications of gene-transfer methodology and developments in continuous fermentation should be pursued. Currently, economic incentive for the use of biological conversion processes for producing fuels and chemical feedstocks from biomass is marginal. But as the imported fraction of US oil supply grows and hydrocarbon costs mount, the market is beginning to motivate a quest for substitutes. The commercial potential for biotechnology for establishing a renewable resources chemicals industry appears similar to the potential of the computer and microelectronics field several decades ago. (ERA citation 05:013718)

21E. Jet and Gas Turbine Engines

AD-A083 651/0 PC **A08**/MF **A01**
Science Applications Inc Canoga Park CA Combustion Science and Advanced Technology Dept
AFOSR Contractors Meeting on Air-Breathing Combustion Dynamics and Kinetics (1979) Abstracts. Held in Alexandria, Virginia on 28 January 1980 - 1 February 1980.
Technical rept.,
R. B. Edelman. 1980, 160p AFOSR-TR-79-1173
Contract F49620-77-C-0044

The report consists of a collection of abstracts of the numerous research progress reports given by AFOSR contractors and of invited papers from other governmental agencies and contractors. These papers presented over a five-day period composed the 1979 annual contractors meeting on Air-Breathing Combustion Dynamics and Kinetics. The principal investigators and their organizational association are also identified. (Author)

AD-A083 766/6 PC **A06**/MF **A01**
General Motors Corp Indianapolis IN Detroit Diesel Allison Div
Time-Variant Aerodynamics for Torsional Motion of Large-Turning Airfoils.
Final rept.,
R. L. Jay, M. D. Rothrock, R. E. Riffel, and G. T. Sinnet. Jan 80, 109p Rept no. DDA-EDR-10192
Contract N00019-79-C-0087

A cascade of five airfoil sections modelling the hub section of an advanced design turbine featuring a high inlet Mach number and 112 degrees of turning was evaluated at 4 steady-state conditions of varying exit Mach number and expansion ratio. The resulting steady-state airfoil surface pressures were compared to a state-of-the-art analytical prediction. A time-variant investigation was conducted at the 4 operating conditions of the steady-state experiment. Time-variant pressure signals were obtained from a Kulite-instrumented airfoil as the cascade was torsionally oscillated at four values of interblade phase angle per expansion ratio by computer-controlled electromagnetic drive systems. The dynamic pressure signals were evaluated in amplitude and phase lag (referenced to blade motion) and correlated with a state-of-the-art analytical prediction based on a flat-plate cascade. A quasistatic experiment was performed to relate the dynamic surface pressure amplitudes to those obtained by resetting the cascade to various temporal positions in the torsional cycle of oscillation. (Author)

AD-A083 890/4 PC **A03**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
A Study of Air Flow Distribution Test of the Annular Combustor of a Jet Engine,
Chin Jushan, and Liu Chenglu. 19 Mar 80, 29p Rept no. FTD-ID(RS)T-0109-80
Edited trans. of Research Report of Peking Aviation Academy (China) BH-B504 n9 p1-26 1979, by H. P. Lee.

No abstract available.

AD-A083 905/0 PC **A03**/MF **A01**
Rockwell International Columbus OH North American Aircraft Div
Computation of the Turbulent Mixing in Curved Ejectors.
Final rept. 1 Sep 78-31 Aug 79,
E. F. Schum, P. M. Bevilaqua, and S. V. Patankar. 30 Apr 80, 44p NR80H-11, ONR-CR212-249-2F
Contract N00014-78-C-0557

A numerical method has been developed to calculate the effects of curvature on the turbulent mixing within a thrust augmenting ejector. Curvature modification are included in both the kinetic energy and dissipation equations of the turbulence model. The elliptic effects of curvature on the mean flow are determined by combining an elliptic solution for the pressure field with a conventional marching solution for the velocity field. Predictions of the velocity profiles for jets and curved duct flows are compared with experimental data. Computation of the curvature effects are shown for an ejector having Coanda jets and one central jet. (Author)

AD-A083 951/4 PC **A03**/MF **A01**
Defence Research Establishment Suffield Ralston (Alberta)
Design of a Film-Cooled Entraining Diffuser.
Technical note,
S. B. Murray. Apr 80, 43p Rept no. DRES-TN-444

A film-cooled entraining diffuser is described which consists of a series of staged cylindrical rings, each overlapping the adjacent one so as to create annular slots for the entrainment of surrounding ambient air. A two-step iterative design procedure is outlined. In step one an analysis similar to that first employed by von Karman is used to calculate the rate at which air is drawn into each slot. In step two these flow rates are used in a downstream-marching, iterative, implicit finite-difference method to calculate the development of wall jet boundary layers downstream of the slots. Details about the design and manufacturing of a three-ring model structure are presented and proposed future experimental validation is discussed. (Author)

AD-A083 987/8 PC **A03**/MF **A01**
Pennsylvania State Univ University Park Applied Research Lab
Documentation of Cascade Unsteady Pressure Difference Program.
Technical memo.,
I-C. Shen. 5 Jan 80, 46p Rept no. ARL/PSU/TM-80-10
Contract N00024-79-C-6043

The response of an axial-flow turbomachine to spatial velocity variations can be determined by the unsteady pressure distribution function which has been developed and represents an extension of an earlier analysis of the unsteady lift. A computer program has been written to formulate the unsteady pressure difference as a function of design parameters. This program is versatile in that it includes the effects of the cascade geometrical parameters and disturbance flow characterisitics, such as the blade camber, angle of incidence, nonconvected disturbance, and it also gives the unsteady lift and moment. The documentation and the use of this program are presented herein. (Author)

N80-22323/3 PC **A16**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Aeroelastic and Structures Research Lab.
Two-Dimensional Finite-Element Analyses of Simulated Rotor-Fragment Impacts Against Rings and BEAMS Compared with Experiments.
T. R. Stagliano, E. A. Witmer, and J. J. A. Rodal. Dec 79, 363p NASA-CR-159645, ASRL-TR-154-13
Contract NGR-22-009-339

Finite element modeling alternatives as well as the utility and limitations of the two dimensional structural response computer code CIVM-JET 4B for predicting the transient, large deflection, elastic plastic, structural responses of two dimensional beam and/or ring structures which are subjected to rigid fragment impact were investigated. The applicability of the CIVM-JET 4B analysis and code for the prediction of steel containment ring response to impact by complex deformable fragments from a trihub burst of a T58 turbine rotor was studied. Dimensional analysis considerations were used in a parametric examination of data from engine rotor burst containment experiments and data from sphere beam impact experiments. The use of the CIVM-JET 4B computer code for making parametric structural response studies on both fragment-containment structure and fragment-deflector structure was illustrated. Modifications to the analysis/computation procedure were developed to alleviate restrictions.

N80-22324/1 PC **A11**/MF **A01**
Pratt and Whitney Aircraft Group, East Hartford, CT.
Performance Deterioration Based on Existing (Historical) Data; Jt9d Jet Engine Diagnostics Program.
G. P. Sallee. 20 Apr 78, 228p NASA-CR-135448, PWA-5512-21
Contract NAS3-20632

The results of the collection and analysis of historical data pertaining to the deterioration of JT9D engine performance are presented. The results of analyses of prerepair and postrepair engine test stand performance data from a number of airlines to establish the individual as well as average losses in engine performance with respect to service use are included. Analysis of the changes in mechanical condition of parts, obtained by inspection of used gas-path parts of varying age, allowed preliminary assessments of component performance deterioration levels and identification of the causitive factors. These component performance estimates, refined by data from special engine back-to-back testing related to module performance restoration, permitted the development of preliminary models of engine component/module performance deterioration with respect to usage. The preliminary assessment of the causes of module performance deterioration and the trends with usage are explained, along with the role each module plays in overall engine performance deterioration. Preliminary recommendations with respect to operating and maintenance practices which could be adopted to control the level of performance deterioration are presented. The needs for additional component sensitivity testing as well as outstanding issues are discussed.

N80-22327/4 PC **A19**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
General Aviation Propulsion.
Mar 80, 437p NASA-CP-2126, E-310
Conf. Held in Cleveland, 28-29 Nov. 1979.

No abstract available.

N80-22350/6 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Preliminary Study of Advanced Turboprop and Turboshaft Engines for Light Aircraft.
G. Knip, R. M. Plencner, and J. D. Eisenberg. Apr 80, 62p NASA-TM-81467, E-397

The effects of engine configuration, advanced component technology, compressor pressure ratio and turbine rotor-inlet temperature on such figures of merit as vehicle gross weight, mission fuel, aircraft acquisition cost, operating, cost and life cycle cost are determined for three fixed- and two rotary-wing aircraft. Compared with a current production turboprop, an advanced technology (1988) engine results in a 23 percent decrease in specific fuel consumption. Depending on the figure of merit and the mission, turbine engine cost reductions required to achieve aircraft cost parity with a current spark ignition reciprocating (SIR) engine vary from 0 to 60 percent and from 6 to 74 percent with a hypothetical advanced SIR engine. Compared with a hypothetical turboshaft using currently available technology (1978), an advanced technology (1988) engine installed in a light twin-engine helicopter results in a 16 percent reduction in mission fuel and about 11 percent in most of the other figures of merit.

N80-22353/0 PC **A06**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (Germany, F.R.). Inst. fuer Antriebstechnik.
Design and Investigation of Static Pressure Compressor Cascades Behind Impulse-Rotors.
Ph.D. Thesis - Technische Hochschule.
R. Fuchs. Mar 79, 119p DFVLR-FB-79-17
Text in German; English Summary. Report Will Be Also Announced as Translation (Esa-TT-629).

The design, optimization, and wind tunnel testing for two dimensional cascades are described. The cascades decelerate the rotor outlet velocity of about M = 2 to subsonic stator outlet velocity by a multiple shock system realizing a high static pressure ratio. The multiple shock cascades with turning and without were tested in a cascade wind tunnel and compared with results of computations.

N80-22354/8 PC **A04**/MF **A01**
National Gas Turbine Establishment, Farnborough (England).
A Digital Computer Program for the Subsonic Flow past Turbomachine Blades Using a Matrix Method.
W. J. Calvert, and D. J. L. Smith. Nov 76, 68p ARC-R/M-3838, BR70994
Supersedes Ngte-R-328; Arc-37294.

A computer program which analyzes the inviscid, subsonic compressible pressure distributions around the blades of axial, radial, and mixed flow turbomachines is described. The flow equations are combined to form a governing, Poisson type differential equation for the stream function and the numerical solution is obtained by a finite difference matrix method. Solutions for several turbomachines, giving flow patterns and velocity distributions are included.

N80-22711/9 PC **A02**/MF **A01**
Rolls-Royce Ltd., Derby (England).
A Ray Theory Approach for High-Frequency Engine-Intake Noise.
A. J. Kempton. 1979, 8p PNR-90001
Presented at Symp. On Mech. Of Sound Generation in Flows, Goettingen, (Germany, F.R.). 1979.

The feasibility of incorporating a ray theory approach to the prediction of high frequency engine intake noise is demonstrated. Ray theory is used to model the propagation of the forward radiated broadband fan noise of a typical high bypass ratio aircraft engine. The use of ray theory to assess the effects of different liners on fan noise is discussed.

N80-22712/7 PC **A02**/MF **A01**
Rolls-Royce Ltd., Derby (England). Engine Div.
Manufacturing of Acoustic Liners for the Gas Turbine Engine.
K. Bird. 1979, 13p PNR-90003

The fabrication of a honeycomb divider between a plain support structure and a porous facing sheet is described. The machining and cutting of the honeycomb slab after immobilization with wax or by ice are described. Electrodischarge machining (spark machining) to perforate the sheet is discussed. Quality control using X-ray examination is shown.

N80-22713/5 PC **A03**/MF **A01**
Rolls-Royce Ltd., Derby (England). Aero Div.
Wear Particle Monitoring.
P. A. Mucklow. 1979, 27p PNR-90006
Presented at Condition Monitoring Res. And Develop. Group of Brit. Inst. Of Non-Destructive Testing, 20 Feb. 1979.

The effectiveness of monitoring systems presently used in aircraft gas turbines is discussed, and the sample analysis procedures are described. Systems which monitor wear particles in the oil through microscopic examination, debris quantification, alloy identification, and ferrography are examined. The practice of collecting and examining particles in the engine gas stream is described. Remote monitoring systems which provide a warning of the presence of wear without the need for regular inspection are discussed.

N80-22734/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

Nonlinear, Three-Dimensional Finite-Element Analysis of Air-Cooled Gas Turbine Blades.
A. Kaufman, and R. E. Gaugler. Apr 80, 22p
NASA-TP-1669, E-074

Cyclic stress-strain states in cooled turbine blades were calculated for a simulated mission of an advanced-technology commercial aircraft engine. The MARC, nonlinear, finite-element computer program was used for the analysis of impingement-cooled airfoils, with and without leading-edge film cooling. Creep was the predominant damage mode (ignoring hot corrosion), particularly artund film-cooling holes. Radially angled holes exhibited less creep than holes with axes normal to the surface. Beam-theory analyses of all-impingement-cooled airfoils gave fair agreement with MARC results for initial creep.

N80-23096/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Time Dependent Difference Theory for Sound Propagation in Axisymmetric Ducts with Plug Flow.
K. J. Baumeister. 1980, 12p NASA-TM-81501, E-438
Presented at 6TH Aeroacoustics Conf., Hartford, Conn. 4-6 Jun. 1980; Sponsored by Aiaa.

The time dependent governing acoustic-difference equations and boundary conditions are developed and solved for sound propagation in an axisymmetric (cylindrical) hard wall duct with a plug mean flow and spinning acoustic modes. The analysis begins with a harmonic sound source radiating into a quiescent duct. This explicit iteration method then calculates stepwise in real time to obtain the transient as well as the 'steady' state solutions of the acoustic field. The time dependent finite difference analysis has two advantages over the steady state finite difference and finite element techniques: (1)the elimination of large matrix storage requirements, and (2)shorter solution times under most conditions.

N80-23097/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Pressure Spectra and Cross Spectra at an Area Contraction in a Ducted Combustion System.
J. H. Miles, and D. D. Raftopoulos. 1980, 12p NASA-TM-81477, E-411
Presented at 1980 Asme Aerospace Conf., San Francisco, 13-15 Aug. 1980.

Pressure spectra and cross-spectra at an area contraction in a liquid fuel, ducted, combustion noise test facility are analyzed. Measurements made over a range of air and fuel flows are discussed. Measured spectra are compared with spectra calculated using a simple analytical model.

N80-23098/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Effect of Inflow Control on Inlet Noise of a Cut-on Fan.
R. P. Woodward, and F. W. Glaser. 1980, 13p NASA-TM-81487
Presented at 6TH Aeroacoustics Conf., Hartford, Conn., 4-6 Jun. 1980; Sponsored by Aiaa.

The control of turbulence and other inflow disturbances in anechoic chambers for static turbofan noise studies was studied. A cut-on, high tip speed fan stage was acoustically tested with three configurations of an inflow control device in an anechoic chamber. Although this was a cut-on design, rotor inflow interaction appeared to be a much stronger source of blade passing tone radiated from the inlet than rotor stator interaction for the 1.6 mean rotor chord separation. Aft external suction applied to the area where the inflow control device joined the inlet produced a further reduction in blade passing tone, suggesting that disturbances in the forward flow on the outside of the inlet were superimposed on the inlet boundary layer and were a significant source of tone noise.

N80-23099/8 PC **A07**/MF **A01**
General Electric Co., Cincinnati, OH.
Analytical Study of the Effects of Wind Tunnel Turbulence on Turbofan Rotor Noise.
Final Report.
P. R. Gliebe, and E. J. Kerschen. Dec 79, 126p
NASA-CR-152359
Contract NAS2-10002

The influence of tunnel turbulence on turbofan rotor noise was carried out to evaluate the effectiveness of the NASA Ames 40 by 80 foot tunnel in simulating flight levels of fan noise. A previously developed theory for predicting rotor/turbulence interaction noise was refined and extended to include first-order effects of inlet turbulence anisotropy. This theory was then verified by carrying out extensive data/theory comparisons. The resulting model computer program was then employed to carry out a parametric study of the effects of fan size, blade number, and operating line on rotor/turbulence noise for outdoor test stand. NASA Ames wind tunnel, and flight inlet turbulence conditions. A major result of this study is that although wind tunnel rotor/turbulence noise levels are not as low as flight levels they are substantially lower than the outdoor test stand levels and do not mask other sources of fan noise.

N80-23100/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Forward Acoustic Performance of a Shock-Swallowing High-Tip-Speed Fan (Qf-13).
J. G. Lucas, R. P. Woodward, and M. J. Mackinnon. May 80, 20p NASA-TP-1668, E-202

Forward noise and overall aerodynamic performance data are presented for a high-tip-speed fan having rotor blade airfoils designed to alter the conventional leading-edge bow shocks to weak, oblique shocks which are swallowed within the interblade channels. It was anticipated that the swallowed shocks would minimize the generation of multiple-pure-tone noise. In the speed range where the shocks presumably were swallowed, the multiple-tone noise was lowered only about 3 decibels. Comparison with several high-speed fans on a thrust-corrected basis indicates that the present fan was the quietest in total forward noise at low speeds but offered no advantage at high speeds.

N80-23104/6 PC **A03**/MF **A01**
European Space Agency, Paris (France).
Noise Generation by Jet-Engine Exhaust Deflection.
B. Gehlar, W. Dobrzynski, and B. Fuhrken. Jul 79, 50p ESA-TT-553, DFVLR-FB-78-21
Transl into English of "Schallerzung durch Triebwerksstrahl-Deflexion", Rept. Dfvlr-FB-78-21, Dfvlr, Brunswick (Germany, F.R.). Sep. 1978. Original Report in German Previously Announced as X79-76750.

Noise radiation by jet engine exhaust-flow-interaction with blast deflectors is investigated by means of model-experiments of scale 0.1. The investigations pertain to a specific deflector configuration. Noise spectra and directivity characteristics for various power-settings and configuration changes are determined and used for the prediction of noise generation by the full-scale configuration. The investigation shows that the particular deflector gives rise to higher noise levels than those of the corresponding engine noise alone when the distance between exhaust nozzle and deflector is less than 10 nozzle-diameters.

N80-23106/1 PC **A04**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.
On the Sound Field Generated by a Fan in a Hard-Walled Baffled Duct with Uniform Flow.
J. N. Laan, and J. B. H. M. Schulten. 22 Feb 78, 67p NLR-TR-78024-U
Contracts NIVR-1773, NIVR-1821

A method to calculate the generation, transmission and radiation of fan noise is described. A steady uniform flow is assumed in the whole field. A hard walled circular duct is considered which is terminated at the open end by an infinite baffle. It is shown that the source mechanism is the impingement of wakes from an upstream row giving rise to fluctuating blade forces: this force field drives the sound field.

PAT-APPL-6-015 675 PC **A02**/MF **A01**
Department of the Navy Washington DC
Fluidic Controlled Diffusers for Turbopumps.
Patent Application,
Sydney Davis, and John M. Durkin. Filed 27 Feb 79, 19p AD-D007 179/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention relates to arrangement for controlling the apparent curvature of diffuser vanes of a turbine fan to reduce stalling of the vanes and increase efficiency of the fan output over a wider range of flow demand. The arrangement has particular use in a ride control system for surface effect ships. (Author)

PB80-179849 PC **A06**/MF **A01**
Pratt and Whitney Aircraft Group, West Palm Beach, FL. Government Products Div.
Advanced Combustion Systems for Stationary Gas Turbine Engines. Volume IV. Combustor Verification Testing. Addendum.
Final rept. Jul-Oct 79,
R. M. Pierce, C. E. Smith, and B. S. Hinton. Jan 80, 119p FR-11405, EPA-600/7-80-017D
Contract EPA-68-02-2136

The reports describe an exploratory development program to identify, evaluate, and demonstrate dry techniques for significantly reducing NOx from stationary gas turbine engines. Volume 4 describes an additional series of tests to evaluate the performance of the combustor on heavy fuels such as petroleum or shale residual oil and solvent refined coal (SRC). Results from the tests show that all exhaust emission goals were met while burning three test fuels: a middle-cut distillate SRC, a residual shale oil, and an Indonesian/Malaysian residual oil. It was also demonstrated that the exhaust emission goals were met when operating a RB/QQ combustor at a high turbine inlet temperature (1426 C design) firing No. 2 fuel oil.

21G. Reciprocating Engines

AED-Conf-78-268-005 MF **A01**
Zentralstelle fuer Atomkernenergie-Dokumentation, Eggenstein-Leopoldshafen (Germany, F.R.).
High-Speed Four-Stroke Gas Engines.
R. Soellner. 1978, 20p CONF-7809111-7
In German.Essen heat pump meeting: drives for heat pumps, Essen, F.R. Germany, 6 Sep 1978. U.S. Sales Only. Microfiche copies only.

High-safety and long-living gas motors were developed in Jenbach from a construction series of fast-running diesel motors with 6, 8, 12, and 16 cylinders and a ratio bore: stroke of 135 to 145 mm, for use in water pump systems. Their most favorable operation speeds are between 750 and 1800 rev/min with a speed control region of 1:2. Average effective pressures of 7.6 bar are achieved in suction operation, when charging with air load cooling, pressure of 11.6 bar are obtained. The specific consumption numbers are lowest for natural gas operation; although they are higher for other gases used, the knock-sensitive fuels are however cheaper, so that it appears economical to make use of these. The emission of harmful substances in the exhaust gases corresponds approximately to limiting values specified in the USA for diesel vehicles which lie far below the limit values for the exhaust gases of locomotive motors specified by the International Railway Association. The slight noise produced simplifies the noise abatement within as well as outside the machine room. The temperature of the exhaust gases is within a favorable range for both full and partial load. (ERA citation 05:013828)

CONS-3288-T5 PC **A02**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg.
Performance of a Diesel Engine; Operating on Raw Coal-Diesel Engine; Solvent Refined Coal-Diesel Fuel Slurries. Quarterly Report.
H. P. Marshall. Dec 79, 3p
Contract ET-78-S-01-3288

It has been difficult to obtain stable experimental slurries of coal or solvent-refined coal for testing in diesel engines. Attempts to burn the 40 percent by weight raw coal-fuel oil slurry were hampered from the outset. First the transfer pump would not deliv-

er the slurry to the injection pump. This problem was overcome by raising the slurry storage tank to increase the positive head on the pump inlet. With the engine running on the slurry blow-by of gases into the crank case increased considerably; the engine ran erratically; and when operating under its own power produced approximately 20 percent of what was expected. Thus, the test was ended after one hour of operation instead of ten hours as was the case with the 20 and 32 percent slurries. The immediate loss of power is thought to be a result of poor penetration, dispersion, and atomization of the injected fuel. A request to revise the scope of the work so that an investigation of this power loss can replace the work required to operate on the 40 percent slurries has been submitted. Inspection of this test engine indicates wear occurs at an excessive rate, although thermodynamic changes are not drastic with 20 and 32 percent by weight coal in the slurries. (ERA citation 05:015679)

N80-22326/6 PC **A02**/MF **A01**
Teledyne Continental Motors, Muskegon, MI.
Design Study: A 186 kw Lightweight Diesel Aircraft Engine.
Final Report.
A. P. Brouwers. Apr 80, 24p NASA-CR-3261
Contract NAS3-20830

The design of an aircraft engine capable of developing 186 kW shaft power at a 7620 m altitude is described. The 186 kW design takes into account expected new developments in aircraft designs resulting in a reassessment of the power requirements at the cruise mode operation. Based on the results of this analysis a three phase technology development program is projected resulting in production dates of 1985, 1992, and 2000.

N80-22700/2 PC **A05**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
Testing of Reciprocating Seals for Application in a Stirling Cycle Engine.
J. F. Curulla, and T. L. Beck. Feb 80, 76p NASA-CR-159820, DOE/NASA/0612-80/1
Contract NAS3-20612

Six single stage reciprocating seal configurations to the requirements of the Stirling cycle engine were evaluated. The seals tested were: the Boeing Footseal, NASA Chevron polyimide seal, Bell seal, Quad seal, Tetraseal, and Dynabak seal. None of these seal configurations met the leakage goals of .002 cc/sec at helium gas pressure of 1.22 x 10 to the 7th power PA, rod speed of 7.19 m/sec peak, and seal environmental temperature of 408 K for 1500 hours. Most seals failed due to high temperatures. Catastrophic failures were observed for a minimum number of test runs characterized by extremely high leakage rates and large temperature rises. The Bell seal attained 63 hours of run time at significantly lowered test conditions.

PB80-178213 PC **A11**/MF **A01**
Oklahoma Univ., Norman. School of Aerospace, Mechanical and Nuclear Engineering.
Combustion of Drops and Sprays of No. 2 Diesel Oil and Its Emulsions with Water and Methanol. Volume I (Experimental).
Final rept. Jul 78-Aug 79,
S. R. Gollahalli, M. L. Rasmussen, and S. J. Moussavi. Jan 80, 231p OU-AMNE-79-15, DOT/RSPA/DPB-50-80/1
Contract DOT-RC-82011
See also Volume 2, PB80-178221.

This report deals with an investigation directed to understand the combustion behavior of No. 2 diesel oil and its emulsions with water and methanol. This Volume (1) of the report presents the experimental results of the study, whereas Volume II describes the theoretical analysis. The experiments are carried out in three parts: (a) a study of stability and microstructure of emulsions, (b) single drop combustion studies, and (c) spray combustion studies. In the first part, the effects of internal phase concentration, the surfactant concentration, and the time of blending on the stability and microstructure of emulsions are examined. In the second part the effects of emulsion characteristics (internal phase concentration, surfactant concentration, and type of internal phase) and ambient variables (chamber temperature, chamber pressure, chamber oxygen concentration, and preheat temperature of emulsions) on the combustion behavior of unsupported single-isolated drops are studied. In the third part the effects of all the variables examined in part b on the combustion behavior and pollutant emission of sprays are studied. The results show that unsupported drops of No. 2 diesel oil emulsions with water and methanol undergo disruption during combustion and the fragmentation activity depends on emulsion and ambient variables. The ignition and pollutant emission characteristics of No. 2 diesel-oil sprays also are seen to be affected by emulsification.

PB80-178221 PC **A07**/MF **A01**
Oklahoma Univ., Norman. School of Aerospace, Mechanical and Nuclear Engineering.
Combustion of Drops and Sprays of No. 2 Diesel Oil and Its Emulsions with Water and Methanol. Volume II (Theoretical).
Final rept. Jul 78-Aug 79,
M. L. Rasmussen, and S. R. Gollahalli. Jan 80, 131p OU-AMNE-79-16, DOT/RSPA/DPB-50-80/2
Contract DOT-RC-82011
See also Volume 1, PB80-178213.

This report deals with an investigation directed to understand the combustion behavior of No. 2 diesel oil and its emulsions with water and methanol. This Volume (II) of the report presents the theoretical analysis, whereas Volume I describes the experimental studies. Two theoretical models to analyze the variation of drop temperature with emulsion parameters have been developed. The differential model considers the diffusion and specific heat effects inside the composite emulsion drop. The integral model does not consider the temperature variation inside the drop. Analytic solutions for both models have been developed assuming constant properties. The integral model has also been solved numerically considering the variation of properties and using some empirical input data. Both models predict the variation of drop disruption time with the internal phase content in qualitative agreement with the experimentally measured values for the drops of No. 2 diesel oil-water emulsion with water volume fractions up to 0.20.

21H. Rocket Motors and Engines

AD-A083 764/1 MF **A01**
Georgia Inst of Tech Atlanta School of Aerospace Engineering
Rocket Research at Georgia Tech.
Interim rept. 1 Oct 78-30 Sep 79,
E. W. Price, W. C. Strahle, Ben T. Zinn, J. E. Hubbartt, and D. H. Neale. Nov 79, 132p
AFOSR-TR-80-0305
Contract F49620-78-C-0003
Availability: Microfiche copies only.

Progress is reported on four distinct projects which are administered as a group. The individual projects are identified as tasks and reported on separately. A summary for each task follows: Task I. Work concerned improvement and application of the impedance tube method for measurement of the presure-coupled combustion response of solid propellants and measurement of the bulk damping in the product flow. Improvements included increaed sites and amplitude range of pressure measurements; increased capacity of the data acquisition system; and a modified, more rapid data reduction program. Admittances and bulk loss coefficients of nonaluminized and aluminized propellants were measured over a range of frequencies. Task II. Studies were continued on external burning using an axisymmetric model at Mach 3. Tests with actual combustion of radially and axially injected hydrogen are then reported. Outstanding performance values with significant base drag reduction is shown for injection and burning directly in the near-wake (base burning). Task III. Investigations continued of the accumulation processes of aluminum on the propellant burning surface that lead to formation of agglomerate droplets, the size of which dominates aluminum combustion. Task IV. Experimental and analytical studies were continued on the subject of turbulence-induced pressure fluctuations in a rocket-like cavity. A new theory was constructed for the generation of pressure disturbances by the turbulence. Undeniable separation has been achieved between propagational and local pressure fluctuations, and the agreement between theory and experiment are adequate.

N80-22404/1 PC **A04**/MF **A01**
European Space Agency, Paris (France).
Hot Gas Side Heat Transfer Coefficients in High Energy Rocket Engines with Thrust Variations.
H. J. Sternfeld. Dec 78, 75p ESA-TT-502-REV, DLR-FB-77-42
Transl. into English of "Heissgasseitage Waermeubergangszahlen in Hochenergetischen Raketentriebwerken bei Schubvariation", Rept. Dlr-FB-77-42 Dfvlr, Lampoldshausen, (Germany, F.R.), Aug. 1977. Original Report in German Previously Announced as X79-71772.

The hot gas side heat transfer coefficient and heat flux in the combustion chamber and nozzle of oxygen/hydrogen, fluorine/hydrogen, and fluorine/ammonia rocket engines were determined. Thrust variation of the capacitatively cooled experimental rocket engines between 200 N and 1500 N was provided by a combustion chamber pressure variation between 3 bars and 15 bars. The results are presented as correlation equations of the form St = A x Re (B) x Pr (C). The local hot gas side heat transfer coefficient was determined from the measured unsteady wall temperature distribution of the engine. The one dimensional analysis was based on the energy conservation law for the heat conductor. The measured temperature field was approximated by approximation functions in space and time.

21I. Rocket Propellants

N80-22510/5 PC **A13**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
Long Term Storage Test of Titanium Material with Liquid Fluorine Propellant.
Final Technical Report, 27 Jan. 1976 - 15 Nov. 1979.
J. R. Denson, W. D. English, J. Roth, and A. Toy. 15 Dec 79, 277p NASA-CR-162872, TRW-29279-6006-RU-00
Contracts NAS7-100, JPL-954450

The compatibility of 6AL-4V Ti with propellant grade GF2 and LF2 at 77 K for up to 3 years was investigated. Titanium double coupons, annealed or heat treated, with 16 or 64 RMS finishes, were immersed in F2 in individual Pyrex capsules and stored under LN2 for 29 and 39 months. Pre and post immersion tests were performed on the propellant and coupons. Chemical analysis of the propellant did not reveal any significant changes due to titanium corrosion. Gravimetric, visual, microscopic, and metallurgical examination with pitting analysis did not reveal gross corrosion of the titanium although pitting appears to be greater after 39 months exposure. The increase in pit size and number raises the possibility of unpredictable crack propagation instability. Fracture toughness tests are necessary to define this possibility.

22. SPACE TECHNOLOGY

22A. Astronautics

N80-22375/3 PC **A99**/MF **A01**
Rockwell International Corp., Downey, CA.
Space Construction System Analysis. Part 2: Construction Analysis.
Final Report.
J. A. Roebuck, P. A. Buck, G. W. Gimlich, H. S. Greenberg, and R. J. Hart. Apr 80, 776p NASA-CR-160579, SSD-80-0038-PT-2
Contract NAS9-15718

The construction methods specific to the end to end construction process for building the ETVP in low Earth orbit, using the space shuttle orbiter as a construction base, are analyzed. The analyses concerned three missions required to build the basic platform. The first mission involved performing the fabrication of beams in space and assembling the beams into a basic structural framework. The second mission was to install the forward support structure and aft support structure, the for-

ward assembly, and a TT&C antenna. The third mission plan was to complete the construction of the platform and activate it to begin operations in low Earth orbit. The integration of the activities for each mission is described along with the construction requirements and construction logic.

N80-22376/1 PC **A05**/MF **A01**
Rockwell International Corp., Downey, CA. Space Operations and Satellite Systems Div.
Space Construction System Analysis. Part 2: Cost and Programmatics.
Final Report.
F. W. Vonflue, and W. Cooper. Apr 80, 76p NASA-CR-160580, SSD-80-0039-PT-2
Contract NAS9-15718

Cost and programmatic elements of the space construction systems analysis study are discussed. The programmatic aspects of the ETVP program define a comprehensive plan for the development of a space platform, the construction system, and the space shuttle operations/logistics requirements. The cost analysis identified significant items of cost on ETVP development, ground, and flight segments, and detailed the items of space construction equipment and operations.

N80-22377/9 PC **A12**/MF **A01**
Rockwell International Corp., Downey, CA.
Space Construction System Analysis. Part 2: Space Construction Experiments Concepts.
Final Report.
J. A. Boddy, L. F. Wiley, G. W. Gimlich, H. S. Greenberg, and R. J. Hart. Apr 80, 261p NASA-CR-160581, SSD-80-0040-PT-2
Contract NAS9-15718

Technology areas in the orbital assembly of large space structures are addressed. The areas included structures, remotely operated assembly techniques, and control and stabilization. Various large space structure design concepts are reviewed and their construction procedures and requirements are identified.

N80-22383/7 PC **A03**/MF **A01**
Technische Universitaet, Munich (Germany, F.R.). Lehrstuhl fuer Raumfahrttechnik.
Interstellar Flight: Challenge and Chance.
H. O. Ruppe. Apr 77, 26p TUM-LRT-RT-KB-77/15

Information on planets outside the solar system is reviewed in view of possible exploratory missions. Project Daedalus, an interstellar ship based on a nuclear fusion drive is discussed along with other propulsion alternatives. Unmanned interstellar probes are discussed.

N80-22385/2 PC **A04**/MF **A01**
European Space Agency, Paris (France).
The International Comet Mission: Report on the Phase A Study.
5 Dec 79, 68p ESA-SCI(79)11

The scientific objectives, mission analysis, system design and management, and time schedule for the Halley, Tempel 2 Comet Mission are outlined. Current knowledge concerning the nature and origin of comets, including the nucleus, coma, and interaction with the solar wind is summarized. Instrumentation and payload of the spacecraft and the ESA probe are described along with design features.

N80-22398/5 PC **A20**/MF **A01**
European Space Agency, Paris (France).
Feasibility Study of a Spacelab Experimental Platform (Seap).
D. Manski, and P. Natenbruk. Oct 78, 460p ESA-TT-495, BMFT-FB-W-77-47
Transl. Into English of "Konzept- und Durchfuehrbarkeitsstudie Einer Spacelab-Experimenten-Antriebsplattform (Seap)", Rept. Bmft-FB-W-77-47 Dfvlr, Cologne and Erno Raumfahrttech. G.M.B.H., Bremen (Germany, F.R.), Dec. 1977. Original Report in German Previously Announced as X79-71394.

The concept of a small Spacelab experiment propulsion platform to accomodate small free-flying shuttle payloads is considered. The orbit maneuvering propulsion system of the platform would economically utilize a monopropellant hydrazine system, while the eight attitude control thrusters of the fully three-axis stabilized system would use cold gas. The energy supply and telemetry/telecommand systems for the platform would be carried onboard, but due to the broad applicability of the design the energy for each payload cannot be provided by the platform. The platform could remain completely stabilized for a longer time in space, execute orbit maneuvers, and then return under its own power to the shuttle. Lightweight construction for the platform as well as highly energetic propulsion systems are unnecessary due to the relatively small specific shuttle costs. Thus it is possible to manufacture the platform cheaply, and more frequent utilization for the many free-flying shuttle experiments of the 80 s will be possible.

PATENT-4 170 904 Not available NTIS
Department of the Navy Washington DC
Single-Axis Disturbance Compensation System.
Patent,
Robert E. Fischell, Glen H. Fountain, Frederick F. Mobley, and Albert C. Sadilek. Filed 12 Dec 77, patented 16 Oct 79, 13p AD-D007 208/2, PAT-APPL-859 355
Supersedes PAT-APPL-859 355-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, foreign licensing. Copy of patene available Commissioner of Patents, Washington DC 20231 $0.50.

The invention relates generally to an improved system for sensing and compensating for external disturbance forces acting on a satellite while in orbit. A proof mass member is housed within an enclosure and shielded from external, non-gravitational forces. The proof mass is electromagnetically levitated to move in a purely gravitational orbit, along an axis aligned with the satellite's velocity vector. The proof mass is subjected to a controlled magnetic biasing field and is caused to have a constant reaction to the resultant biasing force, by means of a thermal control system which maintains constant resistivity of the proof mass, during operation. The position of the proof mass with respect to its axis is detected optically and is utilized to control the firing of spacecraft thrusters. As a result, the satellite is caused to maintain a substantially constant position relative to the proof mass and thereby also is caused to follow a purely gravitational orbit. (Author)

22B. Spacecraft

AD-A083 757/5 MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
A Random Talk on the Appearance of Man-Made Satellites,
Wu Lingyao. 4 Mar 80, 17p Rept no. FTD-ID(RS)T-0080-80
Trans. of Hang K'ung Chih Shih (China) n4 p6-9 1977, by H. P. Lee
Availability: Microfiche copies only.

No abstract available.

N80-22392/8 PC **A14**/MF **A01**
Rockwell International Corp., Downey, CA. Space Operations and Satellite Systems. Div.
Space Construction System Analysis. Part 2: Platform Definition.
Final Report.
R. J. Hart, H. L. Myers, R. D. Abramson, P. N. Dejong, and R. D. Donavan. Apr 80, 312p NASA-CR-160578, SSD-80-0037-PT-2
Contract NAS9-15718

The top level system requirements are summarized and the accompanying conceptual design for an engineering and technology verification platform (ETVP) system is presented. An encompassing statement of the system objectives which drive the system requirements is presented and the major mission and subsystem requirements are described with emphasis on the advanced communications technology mission payload. The platform design is defined and used as a reference configuration for an end to space construction analyses. The preferred construction methods and processes, the important interactions between the platform design and the construction system design and operation, and the technology development efforts required to support the design and space construction of the ETVP are outlined.

N80-22397/7 PC **A03**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
Technology Requirements for Future Earth-to-Geosynchronous Orbit Transportation Systems. Volume 1: Executive Summary.
Final Report.
V. A. Caluori, R. T. Conrad, and J. C. Jenkins. Apr 80, 40p NASA-CR-3265
Contract NAS1-15301

Technologies including accelerated technology that are critical to performance and/or provide cost advantages for future space transportation systems are identified. Mission models are scoped and include priority missions, and cargo missions. Summary data, providing primary design concepts and features, are given for the SSTO, HLLV, POTV, and LCOTV vehicles. Significant system costs and total system costs in terms of life cycle costs in both discounted and undiscounted dollars are summarized for each of the vehicles.

N80-22491/8 PC **A03**/MF **A01**
Hughes Aircraft Co., Culver City, CA. Advanced Technology Lab.
Development of Ultraviolet Rigidizable Materials.
Final Report.
D. P. Salisbury. Oct 79, 42p NASA-CR-161426, FR-79-76-1290
Contract NAS8-32895

A series of tests was performed to determine an optimum resin to be used as a UV rigidizable matrix in expandable rigidizable space structures. Commercially available resins including several types of polyesters, epoxies, epoxy-acrylics, an acrylic and a urethane were used as well as a polyester, produced by 3M Company's Solar Laboratory facility, which was found the best from the standpoint of physical properties and ability to be 'B' staged. Two other synthesized materials were also tested, but were not found to be superior to the Solar resin. An optimum fabric for use with the preferred resin was not found; however, the 15 ounce fabric from Solar Laboratories has the best combination of physical properties with respect to handling and processing characteristics. Expansion techniques for tubular structures, 'B' staging of the solar resin, and stowage techniques for up to 5 months were developed. A one meter high tetrahedron preprototype structure was prepared to evaluate and demonstrate stowage, deployment, and rigidization techniques.

N80-22622/8 PC **A03**/MF **A01**
Centre de Recherches en Physique de l'Environement Terrestre et Planetaire, Orleans (France).
A Method of Measuring the Total DC Electric Field in the Vicinity of a Spacecraft Using Artificially Injected Charged Particles.
M. Pirre, M. Hamelin, T. R. Sanderson, and G. L. Webb. Apr 79, 42p CRPE-NT-68
Submitted for Publication.

A method of measuring both the perpendicular and parallel dc electric field in the vicinity of a spacecraft using artificially injected charged particles is presented. The method uses a rendezvous between the spacecraft and injected particles after a number of complete gyrations around the magnetic field plus one partial gyration in order to measure the field and potential structure at short distances from the spacecraft. The characteristics of the measurements are evaluated with emphasis on the echo delay time of the particles and the sensitivity. The requirements for guns and detectors are assessed including their orientation, the beam intensity, and the detector time resolution and sensitivity.

N80-22735/8 PC **A03**/MF **A01**
Kentron International, Inc., Hampton, VA. Technical Center.
A Design Procedure for a Tension-Wire Stiffened Truss-Column.
W. H. Greene. Apr 80, 36p NASA-CR-3273
Contract NAS1-16000

A deployable, tension wire stiffened, truss column configuration was considered for space structure

applications. An analytical procedure, developed for design of the truss column and exercised in numerical studies, was based on equivalent beam stiffness coefficients in the classical analysis for an initially imperfect beam column. Failure constraints were formulated to be used in a combined weight/strength and nonlinear mathematical programming automated design procedure to determine the minimum mass column for a particular combination of design load and length. Numerical studies gave the mass characteristics of the truss column for broad ranges of load and length. Comparisons of the truss column with a baseline tubular column used a special structural efficiency parameter for this class of columns.

PAT-APPL-6-100 611 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Langley Station, VA.
Mechanical End Joint System for Structural Column Elements.
Patent Application,
H. G. Bush, and R. E. Wallsom. Filed 5 Dec 79, 17p N80-22704/4, NASA-CASE-LAR-12482-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A mathematical end joint system, useful for the transverse connection of strut elements to a common mode is described. Included are node joint half with semicircular tongue and groove and a strut joint half with semicircular tongue and groove. The two joint halves were engaged transversely and the connection was made secure by the inherent physical property characteristics of locking latches or by a spring-actioned shaft. A quick release mechanism is also described which provides rapid disengagement of the joint halves.

22C. Spacecraft Trajectories and Reentry

N80-22379/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Shuttle Orbit IMU Ailnement. Single-Precision Computation Error.
C. R. Mcclain. Mar 80, 31p NASA-TM-80793, JSC-16468

The source of computational error in the inertial measurement unit (IMU) onorbit alignment software was investigated. Simulation runs were made on the IBM 360/70 computer with the IMU orbit alignment software coded in hal/s. The results indicate that for small IMU misalignment angles (less than 600 arc seconds), single precision computations in combination with the arc cosine method of eigen rotation angle extraction introduces an additional misalignment error of up to 230 arc seconds per axis. Use of the arc sine method, however, produced negligible misalignment error. As a result of this study, the arc sine method was recommended for use in the IMU onorbit alignment software.

N80-22380/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Onorbit IMU Alignment Error Budget.
R. W. Corson. Mar 80, 22p NASA-TM-80794, JSC-16463

The Star Tracker, Crew Optical Alignment Sight (COAS), and Inertial Measurement Unit (IMU) from a complex navigation system with a multitude of error sources were combined. A complete list of the system errors is presented. The errors were combined in a rational way to yield an estimate of the IMU alignment accuracy for STS-1. The expected standard deviation in the IMU alignment error for STS-1 type alignments was determined to be 72 arc seconds per axis for star tracker alignments and 188 arc seconds per axis for COAS alignments. These estimates are based on current knowledge of the star tracker, COAS, IMU, and navigation base error specifications, and were partially verified by preliminary Monte Carlo analysis.

N80-22386/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
The Elliptic Anomaly.
G. Janin, and V. R. Bond. Apr 80, 15p NASA-TM-58228

An independent variable different from the time for elliptic orbit integration is used. Such a time transformation provides an analytical step-size regulation along the orbit. An intermediate anomaly (an anomaly intermediate between the eccentric and the true anomaly) is suggested for optimum performances. A particular case of an intermediate anomaly (the elliptic anomaly) is defined, and its relation with the other anomalies is developed.

N80-22389/4 PC **A03**/MF **A01**
European Space Agency, Paris (France).
A Seminumerical Procedure for the Calculation of Geostationary Orbit Perturbations Caused by the Sun and the Moon.
M. C. Eckstein. Aug 78, 28p ESA-TT-485-REV, DLR-IB-552-77/23
Transl. Into English of "Ein Halbnumerisches Verfahren Zur Berechnung der Stoerungen Einer Geostationaeren Bahn durch Sonne und Mond", Rept. Dlr-Ib-552-77/23 Dfvlr Oberpfaffenhofen, Sep. 1977. Original Report in German Previously Announced as X79-73159.

A simplified semi-numerical perturbation method was developed for the special case of nearly geostationary satellites for orbits perturbed by the Sun and Moon. Whereas the analytical form of the perturbation terms can be derived from geometrical considerations, the coefficients are determined by multiple Fourier analysis of the perturbation equations. The perturbations are expressed in terms of equinoctial elements to avoid singularities for zero eccentricity and inclination. The expressions generated by the computer program are presented in the form of subprograms.

N80-22390/2 PC **A03**/MF **A01**
European Space Agency, Paris (France).
Investigations to Determine the Orbit of a European Microwave Satellite.
E. F. Jochim. Aug 78, 50p ESA-TT-486-REV, DLR-IB-552-77/26
Transl. Into English of "Untersuchung Zur Bahnauslegung Eines Europaeischen Mikrowellensatelliten", Rept. Dlr-Ib-552-77/26 Dfvlr, Oberpfaffenhofen, Oct. 1977.

The fundamental relationships between orbital mechanics and coverage geometry for Earth reconnaissance satellites are presented in table and diagram form. As a preliminary to a mission study for Earth reconnaissance satellites using a microwave sensor (synthetic aperture radar) and an optical sensor, covering an area as far as possible simultaneously, three mission models were investigated for a given orbit height. In the final choice of orbit trade-off decisions must be made by the user.

22D. Spacecraft Launch Vehicles and Ground Support

N79-76877/6 PC **A08**/MF **A01**
National Aeronautics and Space Administration, Cocoa Beach, FL. John F. Kennedy Space Center.
Launch Site Accommodations Handbook for STS Payloads,
Dean C. Zimmerman. 14 Mar 78, 163p NASA-TM-80419

The Space Transportation System (STS) is designed to make Space Operations available and economically attractive to many users. This dictates efficient management including documented and controlled interfaces, system capabilities and support services. Toward this end, a series of User Handbooks is presented to describe various elements of the STS (i.e., Orbiter, Spacelab, Upper Stages, etc.). This Handbook describes the basic Launch Site Accommodations available for STS Payload owners (users) at the Kennedy Space Center (KSC) Florida, and at Vandenberg Air Force Base (VAFB) California. The objective of this Handbook is to provide optimum matchup of STS User(s) payload requirements with the available launch site capabilities. The accommodation information is presented to assist and guide STS User(s) in the launch site operational planning. The Handbook, used as a planning tool, should enable efficient and timely integration of all payload requirements into the STS and launch site capabilities.

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